

SAE 2.03

Étude des solutions de Vidéosurveillance sous Linux

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This report contains 3 different solutions for a video surveillance software in Linux. We are choose 3 different software :

- Xeoma
- Agent DVR
- Shinobi

First we are going to explain each software with technical characteristics and we compare them in a second part.

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Xeoma : Video Surveillance

1. Infrastructure and Services

Xeoma is available on multiple operating system such as : « Ubuntu, Debian or even CentOS. It supports lot of database like « MySQL, PostgreSQL and SQLite ». The database allow to store video records and data. For a remote access you need to use a web interface or the mobile app. You can download the “Xeoma VMS” mobile app in the AppStore for iPhone and Google Play for Android to view live feeds or receive notification.

A) Protocols

Xeoma supports lot of protocols for connection, here is a list of the different protocols :

- **RTSP** : [The Real-Time Streaming Protocol \(RTSP\) is a real-time streaming feed over internet for audio and video transmission.](#)
- **ONVIF** : Open Network Video Interface Forum. Its aim is to provide a standard for the interface between different IP-based devices. So ONVIF provide a consistent way for devices from multiple manufacturers to work together.
- **HTTP** : Hypertext Transfer Protocol for accessing web-based cameras.
- **MJPEG** : Motion JPEG for compressed video transmission.
- **MPEG-4** : Standard video compression format for efficient storage.

B) Additional Services

Xeoma offers additional services like :

- Telegram Bot Notifications with unlimited bot subscribers
- Streaming to Youtube for auto broadcasts into your YouTube channel
- Motion Detection : Intelligent algorithms to detect movement in video feeds
- Face recognition: Advanced AI-based facial recognition for identifying individuals.
- License plate recognition: Automatic recognition of vehicle license plates.
- Video analytics: Object detection and tracking, people counting, and heatmaps for advanced video analysis.
- Emotion Recognition (happiness, sadness, neutral, fear, anger, disgust, surprise)
- Crowd detector (counting passengers or visitors, density monitoring, detection of queues)
- Sound events detector (recognition of sounds of gunshot, scream, baby cry, glass break, car alarm)

2. Configuration and Requirements

A) Hardware

The hardware requirements for Xeoma will depend on the number of cameras, the resolution and the frame rate of the streams.

Xeoma had a [calculator of required configuration](#). So the minimal configuration of the camera is :

Incoming network connection speed: 9 Mbps
Outcoming network connection speed: 9 Mbps
You need approximately 0.00 GB free HDD space
Memory(RAM): 0.23 GB RAM
Processor: Core i3 / AMD Athlon X4 / AMD FX-75xx / Intel Core2 Quad Q6xxx / Intel Xeon X3xxx / Pentium G3xxx.

This configuration had a single camera at 720p with 25 FPS, with a remote access for 1 persons and without any module and doesn't had an archive.

Now for a better configuration with 2 cameras at 25 FPS at 1080p with all module, remote access for 10 persons and an archive able to store 60 days of videos we will need.

Incoming network connection speed: 80 Mbps
Outcoming network connection speed: 400 Mbps
You need approximately 25312.50 GB free HDD space
Memory(RAM): 1.50 GB RAM
Processor: Core i7 / AMD Opteron 6376 / Intel Xeon E3-xxxx / AMD FX-8320 Eight-Core.

This configuration needs a lot more resources than the previous one.

B) Software

For the Software, Xeoma is available for Windows, Linux and MacOS.

Xeoma has six editions:

- Starter edition: functionality for starters, live view of an unlimited number of cameras, recording from up to 2, basic remote access
- Lite edition: basic functionality for up to 4 cameras (6 modules in each chain), basic remote access;
- Standard edition: standard video surveillance features, no limitations in time of use
- Pro edition: all the benefits of the standard edition + professional modules and video analytics
- Trial edition: unlimited functionality and any modules while settings restored to defaults every 8 hours/at program exit.
- Free edition : view of up to 1000 cameras (3 modules in each chain).

C) Network

A stable internet connection is required for remote access and the bandwidth required depends on the number of cameras and the resolution of the video streams. for the configuration we show you before you will need an incoming network connection speed of 80 Mbps and an outcoming network connection speed of 400 Mbps.

Xeoma supports a wide range of cameras, including :

- USB cameras : Plug-and-play connectivity for easy setup.
- IP cameras : Network-based cameras for flexible installation and remote monitoring.
- Analog cameras : Support for legacy analog cameras through video capture cards.
- PTZ cameras : Controllable cameras for pan, tilt, and zoom functionality.
- Fisheye cameras : Wide-angle cameras for capturing a broader field of view.

Source :

<https://felenasoft.com/xeoma/fr/>

<https://felenasoft.com/xeoma/en/features/>

<https://felenasoft.com/xeoma/en/help/calculator/>

https://www.f5.com/fr_fr/glossary/real-time-streaming-protocol-rtsp

Agent DVR : Video Surveillance

1. Infrastructure et Services

Agent DVR is available on multiple operating systems like Windows 7 and later, Docker, Linux (it was tested for Ubuntu 20.04), macOS with M1 chipset minimum and Raspberry Pi 4+. It work with a local web interface, you can also use a remote access connection with iSpyConnect.com without port redirection.

A) Protocols

Agent DVR supports lot of protocols for connection, here is a list of the different protocols :

- **FTP** : File Transfer Protocol for transmission of images and videos between cameras and the storage.
- **SFTP** : Secure File Transfer Protocol was developed to securely transfer and manage files over a TCP/IP network. SFTP uses the same commands as the standard File Transfer Protocol (FTP)
- **MQTT** : is a standards-based messaging protocol, or set of rules, used for machine-to-machine communication.
- **RTSP** : [The Real-Time Streaming Protocol \(RTSP\) is a real-time streaming feed over internet for audio and video transmission.](#)

B) Additional Services

Agent DVR offers additional services like :

- Picture in Picture services which allows you to see several video streams at the same time
- Automation based on Sunrise and Sunset
- Events and actions system for advanced automations
- PTZ (ONVIF, digital and IP camera). PTZ presets, scheduler and object tracking. What is PTZ ? A PTZ or Pan Tilt Zoom camera is a video surveillance camera which has panoramic vision thanks to its motorized zoom and its ability to tilt its lens to track a target.
- VR mode for immersive live viewing

2. Configuration and Requirements

A) Hardware

The hardware requirements depends on the number of cameras and microphones used. A PC with 2GB of RAM and 200GB of hard disk space is be more than capable of running 4 cameras at 320 x 240 resolution or 1 camera at 640 x 480 resolution. You can also increase the number of cameras by decreasing the resolution of each camera. One camera at 1280 x 960 requires the same processing power of 4 cameras at 640 x 480 cameras or 16 cameras at 320 x 240.

B) Software

You had different choice for installing, you will have 3 payments method the first is monthly, the second is yearly and the third is every 2 years. In each payments method you will had 4 options :

- **Basic** : 1 Servers connected with SD playback, Push Notifications, remote access and Email Services, Cloud Services
- **Pro** : 3 Servers connected with HD playback, push notifications, remote access, permissions control and email services, Cloud Services
- **Pro Plus** : 5 Servers connected with HD playback, push notifications, remote access, permissions control and email services, Cloud Services
- **Ultimate** : 10 Servers connected with HD playback, push notifications, remote access, permissions control and email services, Cloud Services

- The only thing who change between monthly, yearly and every 2 year payments is the amount of SMS Credit. Monthly you had 0 SMS. Yearly you had 100 SMS. And every 2 years you had 200 SMS.

C) Network

For optimal performance, it is important to use a wired gigabit network connection. If you can't use wired connection, you should use the fastest network (actually is 802.11ax). Make sure the other device on your network don't use the majority of the speed (such as copying files around or watching movies), else you can notice drop in frame rates.

AgentDVR supports the largest cameras connection database, including :

- **Digital Camera** : a camera which produces digital images that can be stored in a computer and displayed on screen.
- **IP Camera** : Surveillance camera using Internet Protocol to transmit images and control signals via the web.

Sources :

<https://www.ispyconnect.com/fr/download>

<https://www.ispyconnect.com/>

<https://www.ispyconnect.com/pricing>

Shinobi : Video Surveillance

1. Infrastructure et Services

Shinobi is available on Ubuntu 22.04. You can install also in Edge Computer like Jetson Nano or Raspberry Pi. These requirements : Node.js (16.x), FFmpeg (Between 3.3 to 4.1), and MariaDB (10.4+) are the main components that Shinobi needs. For a remote connection you can use P2P (Peer-To-Peer), you just need to go at ShinobiShop and make sur you had a valid licence and you can generate an API Key for remote connection.

A) Protocols

- **ONVIF** : Open Network Video Interface Forum. Its aim is to provide a standard for the interface between different IP-based devices. So ONVIF provide a consistent way for devices from multiple manufacturers to work together.
- **FTP** : (File Transfer Protocol) is a network protocol for transmitting files between computers over Transmission Control Protocol/Internet Protocol (TCP/IP) connections.
- **SMTP** : which stands for Simple Mail Transfer Protocol, is an email protocol used for sending email messages from one email account to another via the internet.
- **MQTT** : is a standards-based messaging protocol, or set of rules, used for machine-to-machine communication.

B) Additional Services

- Google Drive Backup, you can backup your camera archive in Google Drive with a google API key.
- Amazon Servers Backup, same at google.

- Facial recognition has been officially tested with the following GPUs :
 - NVIDIA RTX 3070
 - NVIDIA GTX 1660

2. Configuration and Requirements

A) Hardware

We didn't find any information about this subject

B) Software

“ We do custom pricing ! ”

There is no fixed price for licence.

- **School Licence** : Educational Institutions may apply for a School License, free of charge. If you are approved you may also get access to P2P servers.
- **Resellers** : You resell Shinobi licence.
- **Pro** : Easy Remote Access, Extended Features in the Mobile and Desktop Apps, Higher Priority for Support, Regular Updates

C) Network

We didn't find information about network speed or something else.

Source :

<https://hub.shinobi.video/articles/view/3Yhivc6djTtuBPE>

<https://docs.shinobi.video/installation>

<https://docs.shinobi.video/>

Comparaison :

The best videosurveillance Systems is Xeoma for the Important numbers of AI for detection and the Free version with a lot of contents inside.

Features	Xeoma	Agent DVR	Shinobi
Supported Operating Systems	Ubuntu, Debian, CentOS	Windows 7+, Docker, Linux (Ubuntu 20.04), macOS (M1 chipset minimum), Raspberry Pi 4+	Ubuntu 22.04, Edge Computers (Jetson Nano, Raspberry Pi)
Supported Protocols	RTSP, ONVIF, HTTP, MJPEG, MPEG-4	FTP, SFTP, MQTT, RTSP	ONVIF, FTP, SMTP, MQTT
Additional Services	Telegram Bot Notifications, YouTube Streaming, Motion Detection, Face Recognition, License Plate Recognition, Advanced Video Analytics, Emotion Recognition, Crowd Detection, Sound Events Detection	Picture in Picture, Automation based on Sunrise and Sunset, Events and Actions system, PTZ (ONVIF, digital and IP camera), VR mode for immersive live viewing	Google Drive Backup, Amazon Servers Backup, Facial recognition (tested with NVIDIA RTX 3070, NVIDIA GTX 1660)
Minimum Hardware Requirements	Depends on the number of cameras, resolution, and frame rate	PC with 2GB RAM and 200GB hard disk space	Not specified
Minimum Software Requirements	Available on Windows, Linux, and MacOS	Available on Windows, Linux, and MacOS	Available on Linux
License	Starter, Lite, Standard, Pro, Trial, Free	Basic, Pro, Pro Plus, Ultimate	Free license for educational institutions, Pro license for resellers, Pro subscription for users with extended features
Network Connection	Stable Internet connection required, bandwidth depends on the number and resolution of video streams	Wired gigabit network connection recommended, fastest Wi-Fi network recommended	Not specified

Legislation

Individuals can only film the interior of their property (for example, the interior of the house or apartment, the garden, the private access road). They do not have the right to film on public roads, including to ensure the safety of their vehicle parked in front of their home. If the device is used outside private area, for example people outside the family or friends are involved in the home, people must be informed of the existence cameras. (for example, by a display at the entrance to the filmed area). It can be punished with 1 year of jail and 45.000€.

Sources :

https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000049164422

https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000006419288

<https://www.cnil.fr/fr/reglement-europeen-protection-donnees>