

## Viso 12

### System configuration

#### COMPUTERS

Cameras should be connected to computers via POE or POE+ switch (for instance Netgear GS728TP, Netgear GS310TP or its successors). The computers with Viso, Viso Recorder, and Viso Services should be connected in a workgroup. All computers and devices must have a fixed IP address.

Viso has been tested with Dell Precision™ 3660 work-station PCs on Windows 10 and Windows 11. The computer requirements for workstations are:

- *Processor* – Intel Core i5 8500 (six core) 3.0GHz or better
- *Internal memory* – 8 GB or more
- *Hard disk* – 1 TB (minimal, for recording video we advise at least 2 TB)
- *Graphics card* – SSD is recommended, 2 GB NVIDIA Quadro P400, or better

Viso has been tested with Dell Precision 3581 Notebook for a standalone, portable setup:

- *Processor* – Intel Core i7 (6 Core), 2,2 GHz or better
- *Internal memory* – 8 GB or more
- *Hard disk* – 500 GB (minimal)
- *Graphics card* – 4 GB NVIDIA Quadro P600, or better

#### Cameras and screen capture devices

Requirements:

- Support RTSP (Real Time Streaming Protocol) communication, a protocol to stream video and audio data over a network
- Produce H.264 video streams

Viso has been extensively tested with the following cameras at 1080p (resolution of 1920x1080 (2.1 mega-pixel), marketed as Full HD) at 30 fps with:

- Axis M1075 IP camera
- Axis P5525-E PTZ IP camera
- Epiphan Nano (to record a screen)

#### ONVIF Protocol

Support ONVIF (Open Network Video Interface Forum) technology a communication standard for network devices. In Viso, ONVIF enables:

- Pan, Tilt, and Zoom (PTZ) control, if the camera has PTZ
- Recording audio, if the camera has a microphone, or a microphone can be connected to it

#### Network and Bandwidth

Viso requires an internal network of cameras and computers to work. The network must be local and dedicated in order to minimize interference. All cameras on the network should operate via Internet Protocol (IP). Network bandwidth requirements are important considerations when designing a video recording solution. It is important that the chosen network has enough bandwidth available so that the recorded videos are of high quality without suffering from any transmission problems. Various factors influence the network performance and thus the performance of Viso. These factors include:

- the number of cameras per location
- the resolution used (HD vs full HD)
- frame rates (any frame rate, but most often used are 15, 25 or 30 fps)
- the amount of motion of the recorded subjects
- The networking hardware has an effect on the system's behavior.

*Note that different brands use different configuration settings and options. Viso is optimized for use with Netgear switches.*

Any local area network (LAN) will have a limited amount of bandwidth available. If there is not enough bandwidth, then the video breaks up and is of a much lower quality than normal. If more bandwidth is needed, then higher speed switches and hubs are needed. Upgrading to higher quality cabling can also assist with creating more bandwidth. Using Fiber Optic networking, for example, will provide a lot of extra bandwidth between the switch and computer; cameras are limited to 1 Gb/s.

The table below shows the bandwidth demand of Axis IP cameras at 1280x720 and at full HD (resolution 1920x1080).

For most applications a dedicated local network of at least 1 GB suffices. As a rule of thumb 35% of this capacity can be used for video transfer. The network will run into its limitations when 8 full HD cameras or more are used simultaneously. In this case additional measures must be taken to optimize the bandwidth and thus the quality of video recordings.

Although each Viso Recorder can be used for recording of 1-4 cameras, and up to 16 Viso Recorders can be placed on a single computer, Noldus advises to use additional computers and switches when using full HD cameras.

### Light conditions

The more light available in the scene, the better the recorded image will be. To prevent the recorded video from being too noisy or too dark, the amount of light should be sufficient. At the setup, the bandwidth used by the camera can be limited, but this will result in poorer image quality or lower frame rate.

To produce a good-quality image a certain type of camera with enough light sensitivity is needed. When light drops low, the camera must be able to amplify the weak signal from the sensor. In strengthening the signal, an unwanted side effect is that image noise could also be amplified. Apart from impairing overall image quality, noise also increases demands on bandwidth.

Camera settings that influence the image quality are Brightness, Sharpness, Contrast and various settings for

Exposure, which can be adjusted in the setup menu of the camera. Noldus uses default settings as changing this may influence the amount of data produced by the camera. Default settings provides consistently good image quality at the expense of increased bandwidth in low light conditions.

### Audio

Viso offers two recording methods:

- 1 *Through the camera* – up to four Axis cameras with audio may be recorded simultaneously in a single location. Multiple locations can be started to record at the same time. The camera needs to support RTSP and preferably ONVIF. It supports AAC audio and has a microphone, or a microphone can be connected to it. Audio will be recorded directly synchronous with the video of that camera. In Viso the user may select or deselect the audio source to be heard when viewing. The tested cameras have an RTSP audio sample rate of 16 KHz.
- 2 *Through line-in on the PC* – only one microphone can be connected per PC. For a multiple room setup to have audio in each room, each room has to have its own PC for Viso Recorder with its own line-in for the microphone. Through line-in an audio sample rate of 44 kHz can be achieved. Alternatively, an audio matrix or Dante Audio can be used.

### MORE INFORMATION

Please visit our website for more information and contact details.

[www.noldus.com/viso](http://www.noldus.com/viso)

| Cameras            | Number of cameras | Viso data transferred (streaming + viewing) (Mb/s) | One additional viewer (viewing live or recorded sessions) (Mb/s) | Total data transferred |
|--------------------|-------------------|--|--|------------------------|
| 1280x720 @ 25 fps  | 1                 | 10   | 5  | 15                     |
|                    | 4                 | 40   | 20   | 60                     |
|                    | 8                 | 80   | 20   | 100                    |
|                    | 12                | 120  | 20   | 140                    |
|                    | 16                | 160  | 20   | 180                    |
| 1920x1080 @ 25 fps | 1                 | 50   | 25   | 75                     |
|                    | 4                 | 200  | 100  | 300                    |
|                    | 8                 | 400  | 100  | 500                    |
|                    | 12                | 600  | 100  | 700                    |
|                    | 16                | 800  | 100  | 900                    |