

IVS - Storage settings

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1. Introduction, important information

This guide summarizes the details of the IVS storage settings. For a complete overview of the system architecture and configuration, please refer to the *IVS Installation Manual* documentation.

2. Factors affecting Storage capacity

Proper configuration of storage settings is essential for optimal utilization of storage capacity. A well-configured system will store fewer irrelevant events, which are more likely to contain important information. As a result, the server will require less storage capacity and hardware resources, allowing it to manage more cameras and store footage for a longer period.

In most cases, it is not possible to precisely determine the storage needs of a multi-camera surveillance system. This is because several factors influence storage requirements:

- Frequency of motion in the monitored area
- Number of moving objects
- Number of frames to be recorded per second
- Bandwidth set for the video stream provided by the camera

The **Intellio Video System** is capable of filtering out irrelevant movements from a surveillance perspective, enabling more efficient use of storage capacity.

3. Buffers

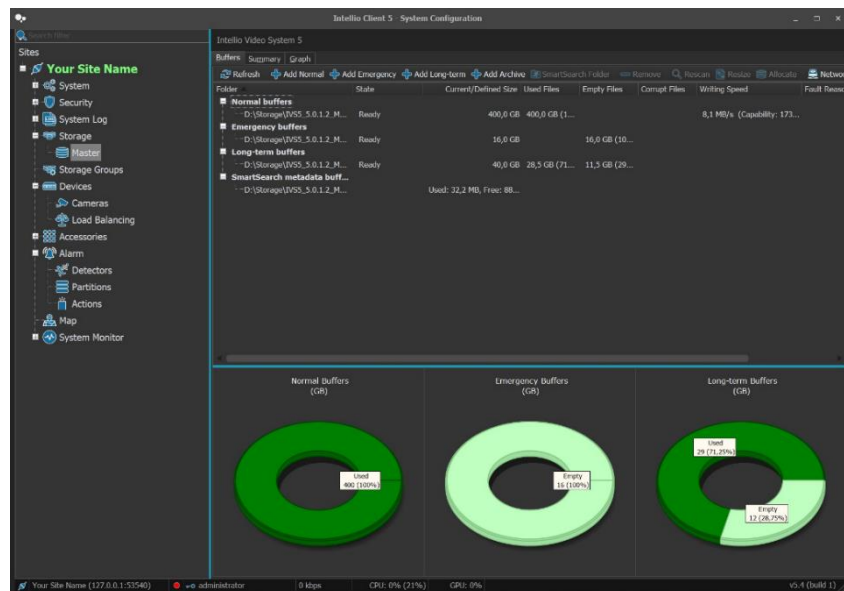
Recordings are stored in pre-allocated storage spaces. These storage spaces are referred to as buffers. The IVS system distinguishes between five different types of buffers:

- **Normal Buffers:** These are essentially the buffers used continuously. Their location can be on the server, but it can also be a network folder (for this, the path must be specified using the **Network Folders** button or by selecting the **Add Network Folder** option after clicking the **Add Normal** button). When the buffer becomes full, the system automatically overwrites the oldest recorded footage. A new normal buffer can be created using the **Add Normal** button.
- **Emergency Buffers:** The system will only store recordings in these buffers if none of the normal buffers are accessible for any reason. Apart from that, it operates the same way as the previous category. It is advisable to create an emergency buffer on any server computer that does not store recordings locally (e.g., use NAS or other network storage), so that as long as the system is running, the recordings will always be stored. An emergency buffer can be created using the **Add Emergency** button.
- **Long-term buffers:** Depending on the settings, recordings from the normal or emergency buffer can be transferred (instead of overwritten or deleted) to the long-term buffer, thus increasing the availability of recordings for certain cameras. It can be created using the **Add Long-Term** button. The use of long-term buffers is configured via **Storage groups** menu.

Note: In a multi-server site, long-term buffers must be created on each server, just like all other buffer types.

- **Archive buffers:** An archive buffer is a group of previously archived files, whose recordings can be manually added to the system for playback and events can be searched. The archive buffer is not overwritable, so the recordings stored in it are always retained and not overwritten. For more information on archiving and restoration, see the [Archiving](#) section.
- **Smart Metadata buffer:** The system will store the Smart Metadata database, enabled on the cameras, here. No size needs to be specified for this buffer, as the system deletes the data after a maximum of 45 days. Specify a folder with enough free space for storing the Smart Metadata. A maximum of 2 GB of storage space per camera can be calculated.

The system provides a lot of useful information about the status of the buffers, as follows:



- **State:** The current state of the buffer. This can be Ready, Fault, Allocation or Scanning.
- **Current/defined size:** The specified size of the buffer directory, as well as the current size (these values may differ, e.g., in case of damaged files).
- **Used files:** The size of files within the buffer directory that contain recordings.
- **Empty files:** The size of files within the buffer directory that do not contain recordings.
- **Corrupt files:** Files that were corrupted during a buffer write or other operation. If these files do not contain usable recordings, they will automatically be deleted after a server restart.
- **Writing speed:** This column provides three important pieces of information. The first indicates the average data write speed, the second shows the buffered write speed (the internal buffer's periodic write speed), and the third displays the speed required to write incoming data.

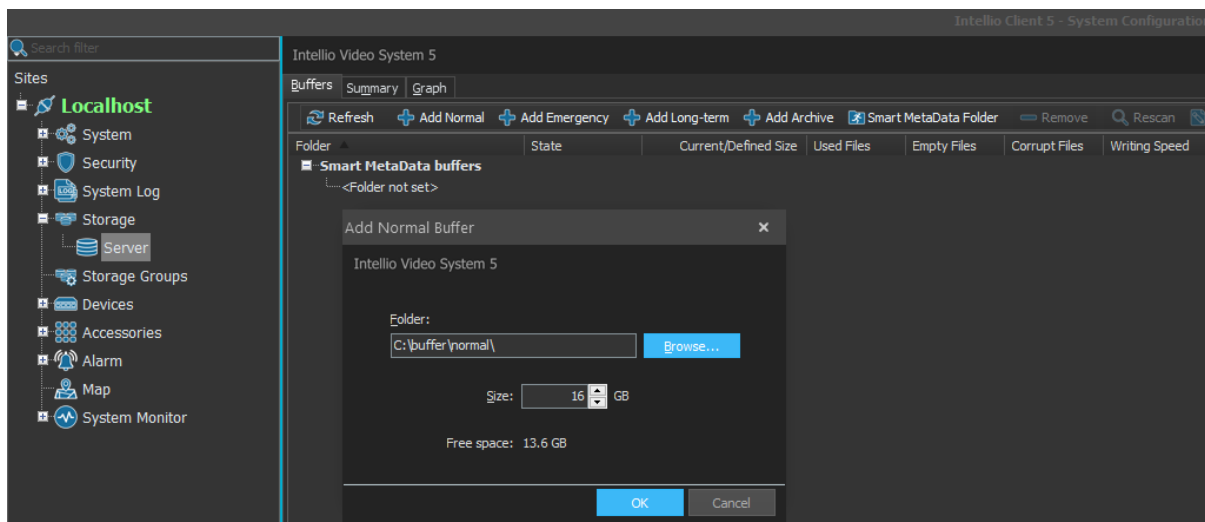
- **Fault reason:** If there is a problem with the buffer directory, the system's internal diagnostic tool will display the cause.

Note: There should not be a significant difference between the actual and required write speeds. If the required speed is higher than the actual speed, the program will not be able to write at the required speed.

3.1. Creating a Video Buffer

To store recordings, disk space must be pre-allocated for them. This allocated area is called a buffer, which ensures that the necessary amount of free storage space is available. The disk space that can be allocated is unlimited, but **at least 16GB** of storage is required (smaller values will not be accepted by the system). A normal buffer can be created on a local drive or a network folder (the latter is not possible in the IVS-SOHO version).

Upon the first connection, if the server does not already have a buffer, it will automatically offer to create a **Normal buffer**. Creating the buffer is not mandatory and can be postponed by closing the window, but the system will not store any data until at least one buffer is specified.



To create a buffer, click the **Browse...** button, and in the window that appears, select the location for the buffer. Choose a folder available on the local drive, or under the **Network** section, you will find previously connected network folders. You can also add new network locations to the system using the **Add network folder...** button. After selecting the location, specify the buffer size (the system will automatically suggest a value based on available free space, and you can modify it according to your needs). After pressing **OK**, the system will immediately allocate the specified storage on the drive.

Important: When storing data on a NAS, be sure to create **Emergency buffers** on all relevant servers to ensure continuous storage even if the network drive becomes unavailable.

The system can later be expanded with buffers as needed. To create a new buffer, select **System Configuration / Storage**, then choose the server where you want to create the video buffer. Press the **Add normal** button, then select the location and size of the buffer directory. After pressing **OK**, the system will immediately allocate the specified storage on the drive.

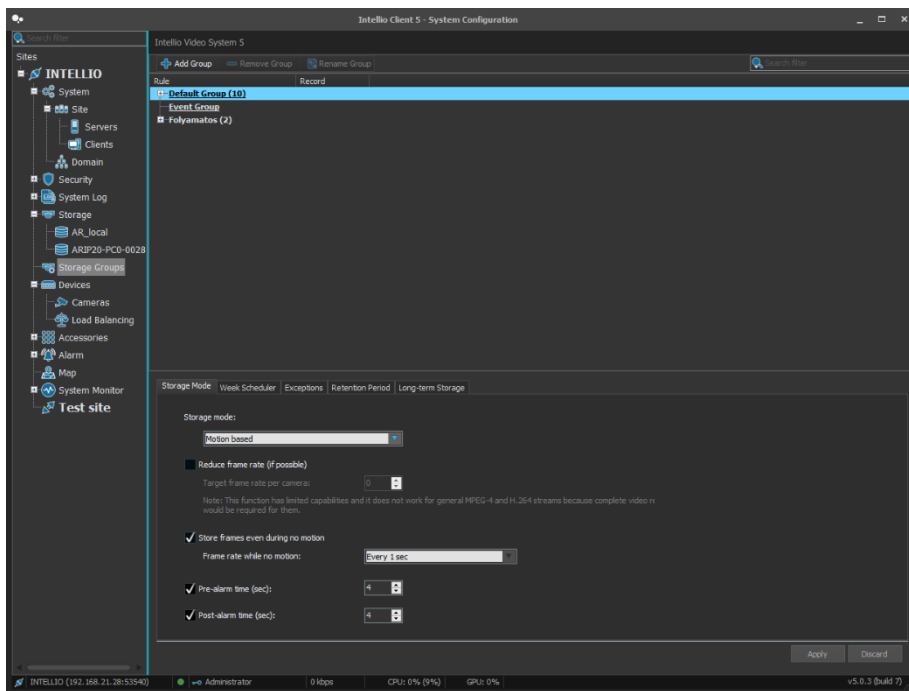
For faster access to recordings, directories larger than 1000 GB cannot be created. If you set a buffer size larger than this, the directory will automatically create multiple subdirectories, none of which will exceed this size limit. These directories can be expanded later, but it is not recommended.

To remove buffers, click the **Remove** button, with the only requirement being that at least one buffer (it can be an Emergency buffer) must exist.

Important: Be sure to never create a buffer in the root directory of the drive!

4. Storage groups

Storage groups define the rules for storing incoming images, sounds, and events. By default, all registered devices are placed in the **Default group**. To create a new group, press the **Add Group** button. Each group can have different storage settings, which apply to all cameras within that group.



Within a group, five tabs are available for configuration:

4.1. Storage mode

This is where the rules for data storage can be configured.

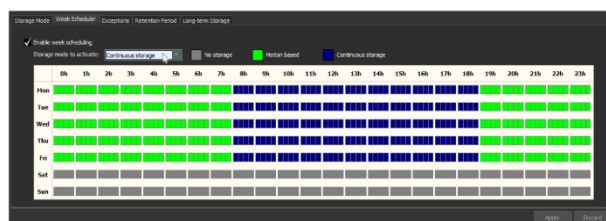
- **Storage Mode:** The dropdown list offers three options:
 - **No Storage:** Although the server receives images from the camera and live footage can be displayed, the server does not store any images. This means no footage will be available for playback, so using this setting is not recommended.
 - **Motion based:** The server only records video when the camera detects motion. This is a highly efficient method, as the server only stores events that may be useful for playback (e.g., intrusion into an area), saving resources by not storing idle periods.
 - **Continuous storage:** The server continuously records the camera's feed regardless of whether motion is detected by the camera.
- **Reduce frame rate (if possible):** By enabling this option, you can set the maximum number of images stored per second (fps). For example, if the cameras operate at 10 fps but the system is capped at 4 fps, the required storage capacity can be reduced by two third. However, this depends on the camera type and video compression, so it cannot be guaranteed. It should be viewed as a guideline. It is important to note that the server does not perform re-encoding during storage for performance reasons and to retain the original video quality. Therefore, this setting might not work with certain video codecs (commonly H.264, MPEG-4, and MPEG-2).
- **Store frames even during no motion:** This feature can be enabled in motion-detected storage mode. When enabled, the system will store frames even if there is no motion in the camera feed. The duration can be set between 1 second and 60 minutes.
- **Pre-alarm** and **Post-Alarm** frame storage: This feature is available in motion-detected storage mode and allows for the storage of frames before and after an alarm or motion detection. The maximum time that can be set is four seconds, as the system cannot store older frames than that.

Note: the set and actual values may differ (the distance between keyframes sent by the camera also affects the actual value).

4.2. Heti ütemezés

On this tab, you can set the weekly recording schedule.

To configure this, check the **Enable week scheduling** checkbox, then select the desired storage mode from the dropdown list. By clicking the small boxes at the intersection of the days and hours, you can mark the periods during which you want to apply the previously selected storage mode.

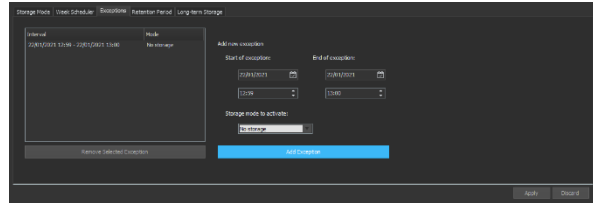


To choose a different storage mode, select the desired option from the dropdown list, then

continue by selecting the appropriate periods. Disabling the schedule will preserve your settings, so it can be re-enabled at any time without needing to configure it again.

4.3. Exceptions

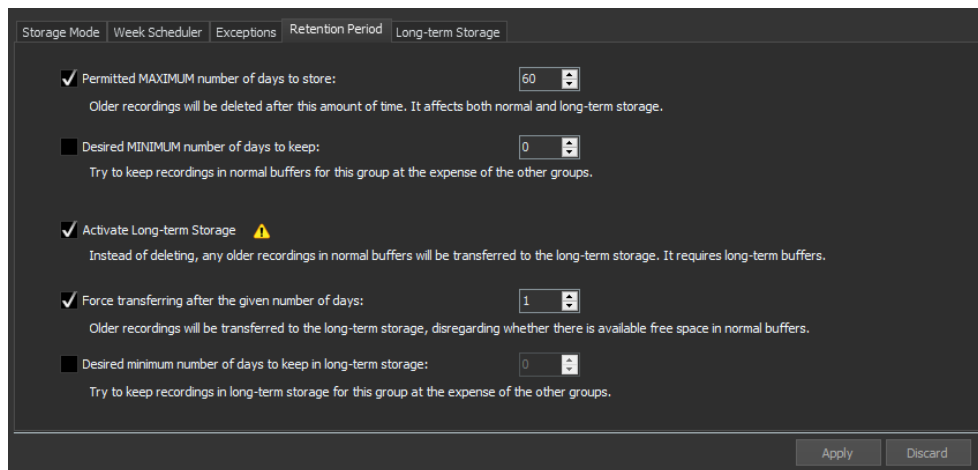
This tab is used for specifying exceptions to the weekly schedule, which are useful for events such as holidays or other occasions that deviate from the usual routine. There is the option to change the storage mode.



To create an exception, set the **Start of exception** and the **End of exception** dates and hours (hh:mm), then select the **Storage mode to activate** during this period.

Multiple exceptions can be set, but for better clarity, it is recommended to remove outdated exceptions from the list. To do so, select the exception and then press the **Remove Selected Exception** button.

4.4. Retention Period

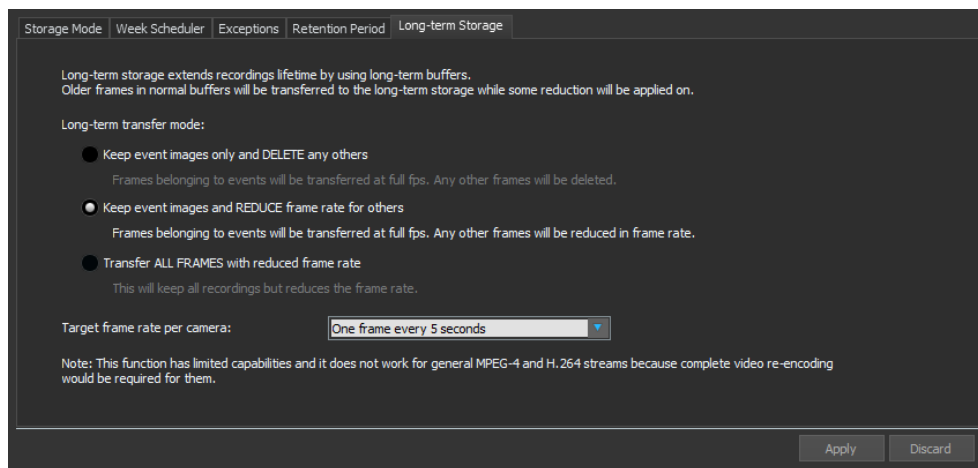


- **Permitted MAXIMUM number of days to store:** The server will delete stored images if the number of stored days reaches the selected value, even if there is free space in the buffers. This setting is applied on the Normal and Long-term buffers.
- **Desired MINIMUM number of days to keep:** The server will always try to save the footage of this storage group; meaning that this storage group will always has priority over the rest. If no more storage space is available, then the system will delete footage from other storage groups to free up space.
- **Activate Long-term Storage:** the checkbox enables the long-term storage for the cameras belonging to this storage group (the details of the settings can be found on the **Long-term Storage** tab).

- **Force transferring after the given number of days:** recordings older than the days set here will be transferred to the Long-term buffer, even if there is still available space in the Normal buffer. Without this setting, recordings will only be moved to the Long-term buffer before the system overwrites them in the Normal buffer.
- **Desired minimum number of days to keep in long-term storage:** the setting is similar to the **Desired MINIMUM number of days to keep** setting; however, it is applied only on the Long-term buffer. The server will try to store the recorded footage in the Long-term buffer for at least the time set here. If there is no storage space available, the system will delete long-term footage from other storage groups.

4.5. Long-term Storage

Regardless of the settings below, a bookmarked recording (all marked cameras for the selected time period, without audio) will automatically be transferred to the long-term buffer.



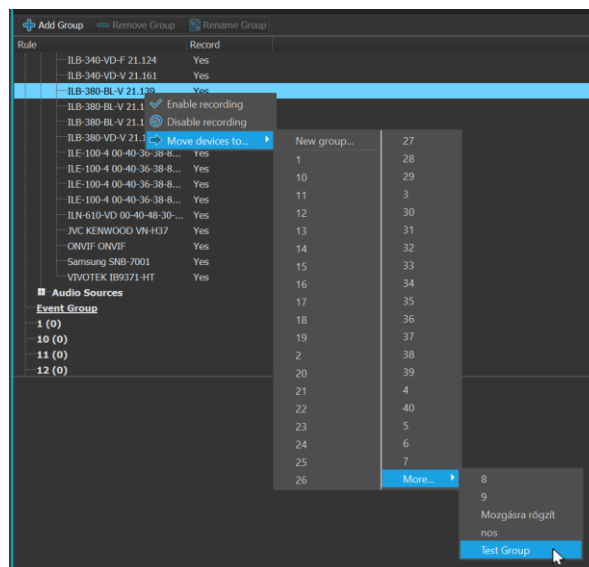
The transfer of other recordings to the Long-term buffer occurs as follows:

- **Keep event images only and DELETE any others:** Recordings associated with events from the storage group's cameras are transferred to the Long-term buffer without modification. Non-event recordings are deleted.
- **Keep event images and REDUCE frame rate for others:** Event-related recordings from the storage group's cameras are transferred to the Long-term buffer without modification. Non-event recordings are transferred at the set reduced frame rate.
- **Transfer ALL FRAMES with reduced frame rate:** All recordings are transferred to the Long-term buffer at the set reduced frame rate.
- **Target frame rate per camera:** Recordings are transferred to the Long-term buffer at the frame rate set here. Storage intervals less frequent than one second are compatible with all cameras, while more frequent intervals depend on the camera type and settings.

4.6. Moving Devices between Groups

Cameras can be freely moved between storage groups by simply dragging them to the desired Storage group.

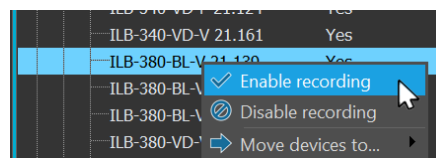
Alternatively, you can relocate a camera by right-clicking on the selected device's name, choosing the **Move Device to...** option, and selecting the target group.



4.7. Enabling/Disabling Recording

It is possible to disable recording for individual cameras. This can be done as follows:

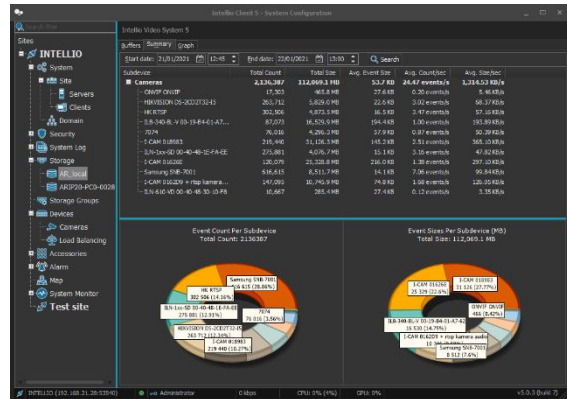
- Open a Storage group.
- Select a camera within the group.
- Right-click on the selected camera, then choose the **Disable recording** or **Enable recording** option.



4.8. Measuring System storage requirements

It is highly beneficial to easily review a system's storage needs. The Intellio Video System can calculate the storage usage over a specified period, allowing you to see which camera is storing significantly more events than others. The storage capacity used by such cameras can be reduced by applying stricter storage rules or fine-tuning the camera settings.

To obtain summarized storage statistics for a specific period:

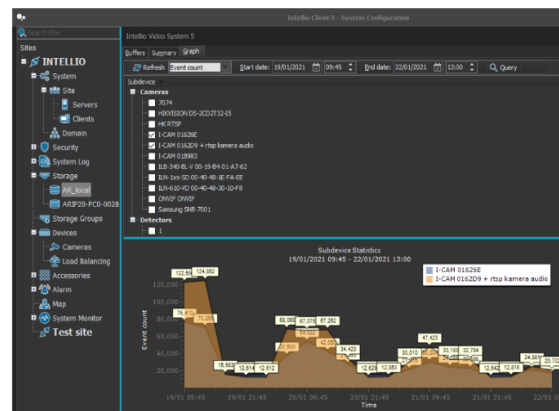


- Select the **System Configuration / Storage** menu or a specific server within it.
- Go to the **Summary** tab.
- Set the start and end dates for the queried period.
- Click the **Search** button.

Using the graphical query interface, you can review the number of events recorded by a camera over a specified time frame. For instance, when examining a one-day period, the graph will show the periods with the highest and lowest data storage volumes and the number of events.

To do this, follow these steps:

- Select the **System Configuration / Storage** menu or a specific server within it.
- Choose the **Graph** tab.
- Select the data to be displayed on the graph (**Event Count** or **Event Size**).
- Check the boxes next to the **Cameras** and/or **Detectors** you wish to include.
- Set the **Start** and **End dates** for the report period.
- Click the **Search** button.



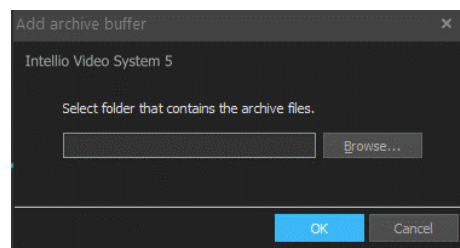
4.9. Archiving

4.9.1. Backup of the buffer

The backup is essentially a simple copy. Copy the ***.rcstore** files recorded during the desired period from the buffer folder(s) to a freely chosen directory or external storage (e.g., **C:\Archive**). Do not delete the copied files from the buffer folder, as they are currently in use as buffer files.

4.9.2. Restoring a backup

Select the server you want to add the archive to in the **System Configuration / Storage** menu, then click the **Add Archive** button. Locate the folder containing the previously saved ***.rcstore** files, and click **OK**. The system will start reading the archived files. By pressing the **Refresh** button, you can track the current status of the process. Once it reaches 100%, the archived buffer can be used as a "normal" buffer, meaning archived recordings can be played back on the **Playback** interface. However, unlike the actual Normal buffer, recordings in the archived buffer will never be overwritten.



5. Further steps

For an overview of additional system settings, please refer to the **IVS Installation Manual** documentation and continue configuring the system by adding devices and cameras.