OnSSI

White paper

Video Storage in Ocularis

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Video Storage in Ocularis 5

The way video data is stored and managed in Ocularis 5 is different than OnSSI's legacy recorders. One of the primary differentiators between generation 4 and generation 5 Ocularis is that there is no longer a need for archiving recorded video. Video is recorded once and retained in this location until such time that the configured retention period expires and the video ages out. When the retention period for video is reached, the video data is purged to allow space for new video. Just how the video data is processed for deletion as well as what happens if the storage capacity is at or near full will be discussed in this document.

Types of Recordings

Images are stored in what's known as the 'Multimedia database' or MDS. The MDS is installed alongside the Device Manager (DM). Therefore, each DM has its own MDS. Both the DM and MDS run as a service and both have their own log.

Stored video is classified as one of two types: Standard Recordings or Alarm Recordings. Standard recordings are those recorded when the 'Standard recording' drop-down in the Image storage configuration section of the camera is set to 'Yes'. This default setting will record Standard video 'Always' and retain the recordings for seven days by default. These settings, of course, may be modified.

Alarm Recordings are images flagged by the system as triggered from some event. The event may be motion detection (server-based or camera-based) or can be another configured event as defined by the camera's configured Alarm scenario such contact closures, Network I/O messages, or analytics (camera-based or third-party). Alarm recordings are also saved for seven days by default.

The retention period for Standard and Alarm recordings, while initially the same, can be set for different periods. It is common, for instance, to save Standard recordings for a shorter duration than Alarm recordings. This allows operators and administrators to have a longer period to examine recordings that may have been triggered due to an alarm vs. video that was recorded from a camera that may have no activity. For more information, please see:

 http://onssi.com/downloads/OnSSI_White_Paper-Understanding_Ocularis_5_Recording_Modes.pdf

It is up to the system administrator to modify the retention settings for a camera's recordings based on the hardware resources as well as the importance (or lack thereof) of what the camera is viewing. If you find that you are running out of disk space for storage, you can decrease the camera's retention periods and/or add additional hardware to accommodate the retained recordings (i.e. add a new zone).

Camera Priority

Each camera can be configured with a priority setting. When enabled, Ocularis will attempt to maintain as much video as possible if the DM is running out of storage space. Cameras with priority enabled will have their data for both Standard and Alarm recordings deleted last. This setting can be enabled under the Image Storage menu in each camera's configuration window.

Data Management

Under normal conditions, Ocularis will retain video data for each camera up to the configured retention policy in a FIFO (first in, first out) operation, deleting video data that is beyond the retention policy. In the event that the available storage cannot accommodate all the recordings as configured, there is a hierarchy to which video is retained and which is not.

When the storage capacity of the Device Manager (DM) reaches 90% of capacity, a warning message is triggered (via SNMP, email[1] or pop-up message in the Ocularis Recorder Manager application). Once the storage capacity reaches 95%, a 'ring buffer' system goes into effect and recordings will begin to be deleted in order to accommodate new recordings. Data is deleted in the following order of prioritization:

1. Standard recording image data is deleted first from a non-priority camera.
2. Alarm recording image data from a non-priority camera.
3. Standard recordings from a prioritized camera (this is where the Priority drop-down under Image storage is set to 'Yes').
4. Alarm recordings from a prioritized camera.

Logs

The Ocularis Recorder maintains extensive logs which provide a wealth of information that can be useful for troubleshooting. Information regarding the video storage is logged in the MDS log (MDS.log). There is an MDS log on each system with a Device Manager (DM). By default, the log files are located at: c:\Program Files\OnSSI\Ocularis Recorder\log. A summary of all zones on the DM are logged in the MDS log every ten minutes.

Example:

```
*** Summary of all LiveZones ***
      Contents:         [2]
      Sequences:        [10]
      Tiles:            [1,181]
      Quota:            [5,120 MB]
      Current size:     [4,851 MB]
      Available quota:  [268 MB]
      Free disk space:  [22,447 MB]

   [LiveZone@16cc601f, ZonePath=[C:\VideoDatabase], Writable=[true]]
      Sequences:        [10]
      Tiles:            [1,181]
      Quota:            [5,120 MB] / Fill Level : [94 %]
      Current size:     [4,851 MB]
      Available quota:  [268 MB]
      Free disk space:  [22,447 MB]
```

In the example above, you can see that the capacity of the zones is 5,120 MB and the current size of the database is 4,851 MB. The data is filled to 94% capacity so once it reaches 95%, video will begin to be deleted.

Next in the log example, you will see camera specific information.

```
[Content@5986b474, ID=[4611967493405144566],Alias=[AXIS Q1615],
Imported=[false], PreAlarmBuffer=[PreAlarmBuffer@2cec9411,
PreAlarmTime=[0 ms], null]]
      Priority:  [no]                                          camera name
      Sequences: [5]
      Entries:   [35,811]
oldest frame   Size:      [1,155 MB]
      First TS:  [1,479,824,376,742]/[Tue, 22 Nov 2016 – 09:19:36,742]
```

---

[1] Email notification by default is not enabled. However, we highly recommend configuring an email alert to notify you if the Device Manager's zones are running out of storage space.

```
            Last  TS:  [1,479,846,155,461]/[Tue, 22 Nov 2016 - 15:22:35,461]
                 Track[0]=[Tue, 22 Nov 2016 - 09:19:36,742]-[Tue, 22 Nov
        2016 - 15:22:35,461], entries=[35,811], size=[1,155 MB], avg.
        frame size=[33 KB], fill level=[3.7 %]
                 Track[1] is empty!
```

Track 0 represents Standard Recording while Track 1 represents alarm recording. You can see from the above example, this camera is only recording standard video and it is taking up 1,155 MB of disk space.

Additionally, the software will check the zone utilization every three minutes and note this in the MDS log. At 90% utilization, the software will generate alerts that the zone is almost out of disk space.

```
[Nov22 15:06:13] INFO [Z.E]
------------------------------------------------------------------------
[Nov22 15:06:13] INFO [Z.E] Zone=[LiveZone@509b7160, ZonePath=[C:\VideoDatabase],
Writable=[true]]
[Nov22 15:06:13] INFO [Z.E]   MaxSize          :    [5,120 MB]
[Nov22 15:06:13] INFO [Z.E]   AvailableQuota   :    [478 MB]
[Nov22 15:06:13] INFO [Z.E]   UsedSize         :    [4,641 MB]
[Nov22 15:06:13] INFO [Z.E]   FreeDiskSpace    :    [22,635 MB]
[Nov22 15:06:13] INFO [Z.E]
------------------------------------------------------------------------
[Nov22 15:06:13] INFO [Z.E] Emergency mode activated : zonesOverflow=[-223 MB]
```

The total available space in our example is 5,120 MB. 95% of this number is 4864 MB. Once the data volume reaches 4641 MB there is 223 MB disk space left.

```
[Nov22 15:06:13] INFO [Z.E] Summary :
[Nov22 15:06:13] INFO [Z.E]   TotalMaxSize=[5,120 MB]
[Nov22 15:06:13] INFO [Z.E]   TotalUsedSize=[4,641 MB]
[Nov22 15:06:13] INFO [Z.E]   FreeDiskSpace  :  [22,635 MB]
[Nov22 15:06:13] INFO [Z.E]   PercentageOfUsage=[90%]
[Nov22 15:06:13] INFO [Z.E]
------------------------------------------------------------------------
[Nov22 15:06:13] INFO [Z.E] MDS at address [192.168.60.85] has a fill level of
[90%]. Ringbuffer trimming will be handled in an emergency mode!
```

When capacity reaches 95%, the log will look like this:

```
[Nov22 15:24:16] INFO [Z.E]
------------------------------------------------------------------------
[Nov22 15:24:16] INFO [Z.E] Zone=[LiveZone@509b7160, ZonePath=[C:\VideoDatabase],
Writable=[true]]
[Nov22 15:24:16] INFO [Z.E]   MaxSize          :    [5,120 MB]
[Nov22 15:24:16] INFO [Z.E]   AvailableQuota   :    [253 MB]
[Nov22 15:24:16] INFO [Z.E]   UsedSize         :    [4,866 MB]
[Nov22 15:24:16] INFO [Z.E]   FreeDiskSpace    :    [22,368]
[Nov22 15:24:16] INFO [Z.E]
------------------------------------------------------------------------
[Nov22 15:24:16] INFO [Z.E] Emergency mode activated : zonesOverflow=[2 MB]
[Nov22 15:24:16] INFO [Z.E] Summary:
[Nov22 15:24:16] INFO [Z.E]   TotalMaxSize=[5,120 MB]
```

```
[Nov22 15:24:16] INFO [Z.E]   TotalUsedSize=[4,866 MB]
[Nov22 15:24:16] INFO [Z.E]   FreeDiskSpace  :  [22,368 MB]
[Nov22 15:24:16] INFO [Z.E]   PercentageOfUsage=[95%]
[Nov22 15:24:16] INFO [Z.E]
-----------------------------------------------------------------------
[Nov22 15:24:16] INFO [Z.E] MDS at address [192.168.60.85] has a fill level of
[95%]. Ringbuffer trimming will be handled in an emergency mode!
[Nov22 15:24:16] INFO [CoreServiceWrapper.sendEvent]
```

Standard trimming will keep the retention time for all cameras of the lowest priority at the same recording amount. In other words, the same amount of video will be retained across all cameras. It does not take into account which camera is recording using the most amount of storage.

Every time 'emergency mode' is invoked, the system looks to see which camera has the highest utilization and will trim from that camera first. Trimming occurs on the one camera. If utilization drops below 95%, trimming will stop. If it does not drop below 95%, the system goes to the next camera and trims the same time period. If 100% fill level is reached, alarm based recordings can also be trimmed.

```
[Nov22 15:24:16] INFO [Z.E] Check ringbuffer for contents with priority [0],
ZonesOverflow=[2 MB]
[Nov22 15:24:16] INFO [H.B] Doing additional trimming for track [1] and
[Content@5986b474, ID=[4611967493405144566], Alias=[AXIS Q1615],
Imported=[false],PreAlarmBuffer=[PreAlarmBuffer@284fle63, PreAlarmTime=[0 ms],
null]]
[Nov22 15:24:16] INFO [H.B] Trimming content with [0 d, 0 h, 18 m]:
[Content@5986b474, ID=[4611967493405144566], Alias=[AXIS Q1615], Imported=[false],
PreAlarmBuffer=[PreAlarmBuffer@284fle63, PreAlarmTime=[0 ms], null]]
[Nov22 15:24:16] INFO [H.B]   Fill level  : 3 %
[Nov22 15:24:16] INFO [H.B] After additional trimming : [Sequence516@36e5f8f5,
Path=[C:\VideoDatabase\20161122\0916\588cb6baee076a25], ReadOnly=[false],
[SequenceInfo@343bb8fb, Version=[6.3.0], Content=[4611967493405144566]/[AXIS
Q1615], VideoSourceType=[-1], VideoServerType=[-1]], [A@3ced8187,
Filename=[C:\VideoDatabase\20161122\0916\588cb6baee076a25\si.idx], Timerange=[Tue,
22 Nov 2016 - 09:39:39,329]-[Tue, 22 Nov 2016 - 10:41:25,833],
Filename=[C:\VideoDatabase\20161122\0916\588cb6baee076a25\si.idx], Size=[596,914
KB]]]
[Nov 22 15:24:16] INFO [H.B] Additional trimming finished for [Content@5986b474,
ID=[4611967493405144566], Alias=[AXIS Q1615], Imported=[false],
PreAlarmBuffer=[PreAlarmBuffer@284fle63, PreAlarmTime=[0 ms], null]]
[Nov 22 15:24:16] INFO [H.B]   Fill level : 3 %
[Nov 22 15:24:16] INFO [Z.A] Trimming for [174 MB] : [Content@5986b474,
ID=[4611967493405144566], Alias=[AXIS Q1615], Imported=[false],
PreAlarmBuffer=[PreAlarmBuffer@284fle63, PreAlarmTime=[0 ms], null]]
[Nov 22 15:24:16] INFO [Z.A]   zonesOverflow now [2 MB]
[Nov 22 15:24:16] INFO [Z.E] Check ringbuffer for contents with priority [1],
ZonesOverflow=[-173 MB]
```

Conclusion

Video storage and retention in Ocularis 5 is easy and straightforward to understand once you know some of the basics. As you can see, it is important to understand the camera's storage configuration settings and their impact on video storage. Setting cameras with priority is also important to retain certain video that may be more important than other video. Adding new zones is another way to effectively manage your video storage.

 If you have any questions whatsoever regarding how to best configure storage settings in your environment, please contact OnSSI Technical Support (support@onssi.com).

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