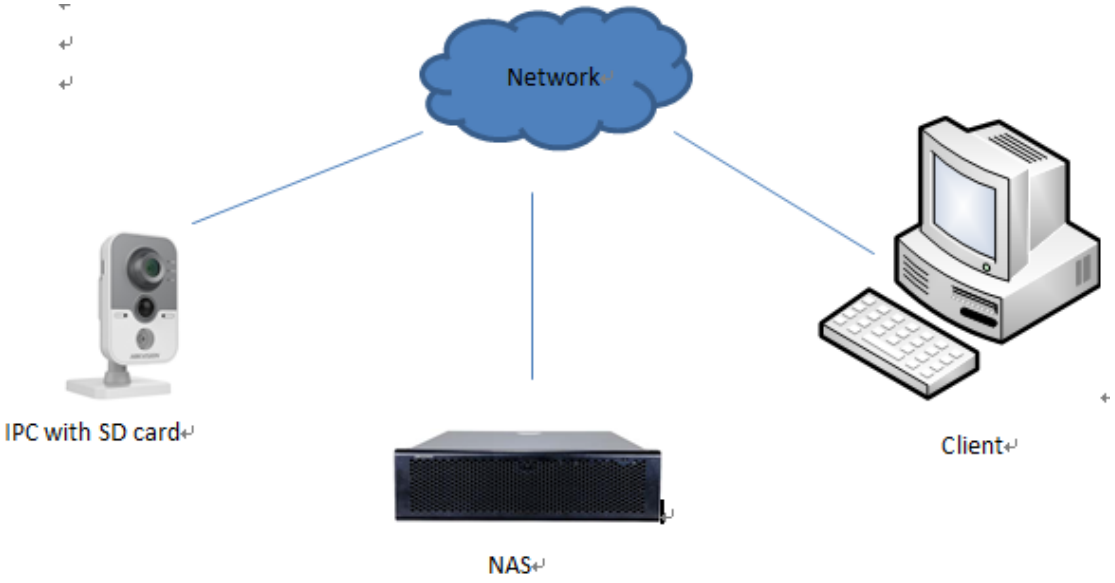
How to Integrate Storage Function of Hikvision IP Camera

During the integration, many questions about storage of IP camera have been proposed. According to the questions and actual realization, I summarize the whole storage integration for follow-up integration.

SD card and NAS are supported by Hikvision IP camera. The following diagram will show clearly.



(1)Firstly, send GET */ISAPI/ContentMgmt/Storage* to get the supported storage media.

Responding data

```
HTTP/1.1 200 OK
Date: Wed, 18 Jun 2014 12:37:14 GMT
Server: App-webs/
Connection: close
Content-Length: 1051
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<storage version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
<hddList version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema" size="8" >
<hdd version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
<id>1</id>
<hddName>hdde</hddName>
<hddPath></hddPath>
<hddType>SATA</hddType>
<status>ok</status>
<capacity>15193</capacity>
<freeSpace>12288</freeSpace>
<property>RW</property>
</hdd>
</hddList>
<nasList version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
```

```
<nas version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">

<id>9</id>
<addressingFormatType>ipaddress</addressingFormatType>
<ipAddress>10.10.36.252</ipAddress>
<portNo>0</portNo>
<nasType>NFS</nasType>
<path>/dvr/helinming</path>
<status>ok</status>
<capacity>9980</capacity>
<freeSpace>8960</freeSpace>
<property>RW</property>
<mountType>NFS</mountType>
</nas>
<supportMountType opt="NFS,SMB/CIFS"/>
<authentication opt="SMB/CIFS"/>
</nasList>
<workMode>quota</workMode>
</storage>
```

The SD card id starts from 1, while NAS id starts from 9.

SD card and NAS information can also be got separately.

If there is only SD card, Send *GET /ISAPI/ContentMgmt/Storage/hdd* command will get the SD card info.

```
HTTP/1.1 200 OK
Date: Wed, 18 Jun 2014 12:46:51 GMT
Server: App-webs/
Connection: close
Content-Length: 397
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<hddList version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema" size="8" >
<hdd version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
<id>1</id>
<hddName>hdde</hddName>
<hddPath></hddPath>
<hddType>SATA</hddType>
<status>ok</status>
<capacity>15193</capacity>
<freeSpace>12288</freeSpace>
<property>RW</property>
</hdd>
```

```
</hddList>
```

Similarly, Send *GET /ISAPI/ContentMgmt/Storage/nas* command will get the NAS info. Because the integrated model is DS-2012 and DS-2112 for Skywatch, so they only need to this command.

```
HTTP/1.1 200 OK
Date: Wed, 18 Jun 2014 12:56:40 GMT
Server: App-webs/
Connection: close
Content-Length: 582
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<nasList version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
<nas version="1.0" xmlns="http://www.std-cgi.com/ver10/XMLSchema">
<id>9</id>
<addressingFormatType>ipaddress</addressingFormatType>
<ipAddress>10.10.36.252</ipAddress>
<portNo>0</portNo>
<nasType>NFS</nasType>
<path>/dvr/helinming</path>
<status>ok</status>
<capacity>9980</capacity>
<freeSpace>8704</freeSpace>
<property>RW</property>
<mountType>NFS</mountType>
</nas>
<supportMountType opt="NFS,SMB/CIFS"/>
<authentication opt="SMB/CIFS"/>

</nasList>
```

(2)The next step is to format SD card and NAS. This is a necessary step, because format will pre-allocate the quota of SD card and NAS, and also expand service life of storage media.

Send *PUT /ISAPI/ContentMgmt/Storage/hdd/1/format* to format the first SD card.
Send *GET /ISAPI/ContentMgmt/Storage/hdd/1/formatstatus* to get the status after format.

```
HTTP/1.1 200 OK
Date: Wed, 18 Jun 2014 13:24:39 GMT
Server: App-webs/
Connection: close
Content-Length: 186
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<formatStatus version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<formating>false</formating>
<percent>100</percent>
```

```
</formatStatus>
```

Send *PUT /ISAPI/ContentMgmt/Storage/nas/9/format* to format the first NAS.

```
HTTP/1.1 200 OK
Date: Tue, 17 Jun 2014 19:28:45 GMT
Server: App-webs/
Connection: close
Content-Length: 291
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<ResponseStatus version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<requestURL>/ISAPI/ContentMgmt/Storage/nas/9/format</requestURL>
<statusCode>1</statusCode>
<statusString>OK</statusString>
<subStatusCode>ok</subStatusCode>
</ResponseStatus>
```

Send *GET /ISAPI/ContentMgmt/Storage/nas/9/formatstatus* to get the status after format.

```
HTTP/1.1 200 OK
Date: Wed, 18 Jun 2014 13:39:29 GMT
Server: App-webs/
Connection: close
Content-Length: 186
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<formatStatus version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<formating>false</formating>
<percent>100</percent>

</formatStatus>
```

Without format, storage can't be used, and alert will keep sending to you when you get event notification data stream through http.

http://IP address:http port/ISAPI/Event/notification/alertStream or

Send *GET /ISAPI/Event/notification/alertStream* command

The Responding data without format will including the following information:

eventType: diskerror

The responding data after format:

```
<protocol>HTTP</protocol>
<macAddress>44:19:b6:16:e6:f1</macAddress>
<channelID>1</channelID>
<dateTime>2014-06-18T13:42:03-00:00</dateTime>
<activePostCount>0</activePostCount>
<eventType>videoloss</eventType>
```

```
<eventState>inactive</eventState>
<eventDescription>videoloss alarm</eventDescription>
</EventNotificationAlert>
--hikboundary
Content-Type: application/xml; charset="UTF-8"
Content-Length: 476
<EventNotificationAlert version="1.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<ipAddress>192.0.0.64</ipAddress>
<portNo>8084</portNo>
<protocol>HTTP</protocol>
<macAddress>44:19:b6:16:e6:f1</macAddress>
<channelID>1</channelID>
<dateTime>2014-06-18T13:42:03-00:00</dateTime>
<activePostCount>0</activePostCount>
<eventType>videoloss</eventType>
<eventState>inactive</eventState>
<eventDescription>videoloss alarm</eventDescription>

</EventNotificationAlert>
```

Send */ISAPI/ContentMgmt/Storage/quota/<ID>* to preallocate

```
GET /ISAPI/ContentMgmt/Storage/quota/1

HTTP/1.1 200 OK
Date: Tue, 24 Jun 2014 20:49:18 GMT
Server: App-webs/
Connection: close
Content-Length: 412
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<diskQuota version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<id>1</id>
<type>ratio</type>
<videoQuotaRatio>75</videoQuotaRatio>
<pictureQuotaRatio>25</pictureQuotaRatio>
<totalVideoVolume>7424</totalVideoVolume>
<totalPictureVolume>2304</totalPictureVolume>
<freeVideoQuota>4608</freeVideoQuota>
<freePictureQuota>2304</freePictureQuota>

</diskQuota>
```

(3)After finish the preparation, record schedule needs to be configured. You can get the current

record schedule by sending *GET /ISAPI/ContentMgmt/record/tracks/101*.

Send *PUT* /ISAPI/ContentMgmt/record/tracks/101 to configure record schedule.

```
<Track version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<id>101</id>
<Channel>101</Channel>
<Enable>false</Enable>
<Description>trackType=standard,trackType=video,codecType=H.264-BP,resolution=320x240,fra
merate=1.960000 fps,bitrate=1024 kbps</Description>
<TrackGUID>e32e6863-ea5e-4ee4-997e-4419b616e6f1</TrackGUID>
<Duration>P30DT0H</Duration>
<DefaultRecordingMode>CMR</DefaultRecordingMode>
<LoopEnable>true</LoopEnable>
<SrcDescriptor>
<SrcGUID>e32e6863-ea5e-4ee4-997e-4419b616e6f1</SrcGUID>
<SrcChannel>1</SrcChannel>
<StreamHint>trackType=standard,trackType=video,codecType=H.264-BP,resolution=320x240,fra
merate=1.960000 fps,bitrate=1024 kbps</StreamHint>
<SrcDriver>RTSP</SrcDriver>
<SrcType>H.264-BP</SrcType>
<SrcUrl>rtsp://localhost/PSIA/Streaming/channels/101</SrcUrl>
<SrcType>DESCRIBE, SETUP, PLAY, TEARDOWN</SrcType>
<SrcLogin>admin</SrcLogin>
</SrcDescriptor>
<TrackSchedule>
<ScheduleBlock ScheduleActionSize="8" >
<ScheduleBlockGUID>{00000000-0000-0000-0000-000000000000}</ScheduleBlockGUID>
<ScheduleBlockType>www.std-cgi.com/racm/schedule/ver10</ScheduleBlockType>
<ScheduleAction>
<id>1</id>
<ScheduleActionStartTime>
<DayOfWeek>Monday</DayOfWeek>
<TimeOfDay>00:00:00</TimeOfDay>
</ScheduleActionStartTime>
<ScheduleActionEndTime>
<DayOfWeek>Monday</DayOfWeek>
<TimeOfDay>00:00:00</TimeOfDay>
</ScheduleActionEndTime>
<ScheduleDSTEnable>false</ScheduleDSTEnable>
<Description>nothing</Description>
<Actions>
<Record>true</Record>
<ActionRecordingMode>CMR</ActionRecordingMode>
</Actions>
</ScheduleAction>
```

```
<ScheduleAction>
……
</ScheduleBlock>
</TrackSchedule>
<CustomExtensionList>
<CustomExtension>
<CustomExtensionName>www.std-cgi.com/RaCM/trackExt/ver10</CustomExtensionName>
<enableSchedule>false</enableSchedule>
<SaveAudio>true</SaveAudio>
<RedundancyRecord>false</RedundancyRecord>
<PreRecordTimeSeconds>5</PreRecordTimeSeconds>
<PostRecordTimeSeconds>5</PostRecordTimeSeconds>
</CustomExtension>
</CustomExtensionList>
</Track>
```

The red part <SrcUrl> tag: *<SrcUrl>rtsp://localhost/PSIA/Streaming/channels/101</SrcUrl>,* 101 represents main stream, 102 represents sub stream, 103 represents the third stream. <ScheduleActionStartTime> and </ScheduleActionEndTime> separately represents the start time and end time of record schedule.

The another red part *<ActionRecordingMode>:<ActionRecordingMode>CMR</ActionRecordingMode>*, stands for recording type, and CMR represents timing schedule. The type of record schedule is listed below.

<ActionRecordingMode>	type
CMR	Timing record
MOTION	Motion detection record
ALARM	Alarm input record
EDR	Alarm|Motion record
ALARMANDMOTION	Alarm&Motion record
FaceDetection	Face detection record
AudioDetection	Audio exception record
pir	PIR record
FieldDetection	Intrusion detection record

In <CustomExtension>, you can set prerecord time and postrecord time.

In addition, send *PUT /ISAPI/ContentMgmt/record/tracks/103* to configure timing schedule capture.

(4)Send PUT /ISAPI/System/Video/inputs/channels/1/motionDetection to enable/disable motion detection and configure 'sensitivity','grid'.

(5)Send *POST(Get) /ISAPI/ContentMgmt/search* to engage a search.

The sending Xml

```
<CMSearchDescription version="2.0" xmlns="http://www.isapi.org/ver20/XMLSchema">
<searchID>C6022BA1-BB30-0001-B811-95A517711717</searchID>
<trackIDList>
<trackID>101</trackID>
```

```
</trackIDList>
<timeSpanList>
<timeSpan>
<startTime>2014-06-18T16:00:00Z</startTime>
<endTime>2014-06-22T15:59:59Z</endTime>
</timeSpan>
</timeSpanList>
<contentTypeList>
<contentType>video</contentType>
</contentTypeList>
<maxResults>40</maxResults>
<searchResultPostion>0</searchResultPostion>
<metadataList>
<metadataDescriptor>//metadata.psia.org/VideoMotion</metadataDescriptor>
</metadataList>
</CMSearchDescription>
```

Note: the start time and end time here is time of zero time zone.

<trackID>： 101 represents the searching result is record, and 103 represents the searching result is picture.

The responding data

```
HTTP/1.1 200 OK
Date: Thu, 19 Jun 2014 10:22:00 GMT
Server: App-webs/
Connection: close
Content-Length: 2283
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<CMSearchResult version="1.0" xmlns="urn:psialliance-org">
<searchID>{C6022BA1-BB30-0001-B811-95A517711717}</searchID>
<responseStatus>true</responseStatus>
<responseStatusStrg>OK</responseStatusStrg>
<numOfMatches>3</numOfMatches>
<matchList>
<searchMatchItem>
<sourceID>{0000000000-0000-0000-0000-000000000000}</sourceID>
<trackID>101</trackID>
<timeSpan>
<startTime>2014-06-18T22:30:30Z</startTime>
<endTime>2014-06-18T22:31:53Z</endTime>
</timeSpan>
<mediaSegmentDescriptor>
<contentType>video</contentType>
<codecType>H.264-BP</codecType>
<playbackURI>rtsp://10.10.39.14/Streaming/tracks/101?starttime=2014-06-18T22:30:30Z&amp;
```

endtime=2014-06-18T22:31:53Z&name=ch01_08000000011002401&size=638552</playbackURI>
</mediaSegmentDescriptor>
<metadataMatches>
<metadataDescriptor>recordType.meta.std-cgi.com/motion</metadataDescriptor>
</metadataMatches>
</searchMatchItem>
<searchMatchItem>
<sourceID>{0000000000-0000-0000-0000-000000000000}</sourceID>
<trackID>101</trackID>
<timeSpan>
<startTime>2014-06-19T00:33:33Z</startTime>
<endTime>2014-06-19T00:34:57Z</endTime>
</timeSpan>
<mediaSegmentDescriptor>
<contentType>video</contentType>
<codecType>H.264-BP</codecType>
<playbackURI>rtsp://10.10.39.14/Streaming/tracks/101?starttime=2014-06-19T00:33:33Z&endtime=2014-06-19T00:34:57Z&name=ch01_08000000011002501&size=662384</playbackURI>
</mediaSegmentDescriptor>
<metadataMatches>
<metadataDescriptor>recordType.meta.std-cgi.com/motion</metadataDescriptor>
</metadataMatches>
</searchMatchItem>
<searchMatchItem>
<sourceID>{0000000000-0000-0000-0000-000000000000}</sourceID>
<trackID>101</trackID>
<timeSpan>
<startTime>2014-06-19T00:34:57Z</startTime>
<endTime>2014-06-19T00:38:00Z</endTime>
</timeSpan>
<mediaSegmentDescriptor>
<contentType>video</contentType>
<codecType>H.264-BP</codecType>
<playbackURI>rtsp://10.10.39.14/Streaming/tracks/101?starttime=2014-06-19T00:34:57Z&endtime=2014-06-19T00:38:00Z&name=ch01_08000000011002601&size=1181152</playbackURI>
</mediaSegmentDescriptor>
<metadataMatches>
<metadataDescriptor>recordType.meta.std-cgi.com/motion</metadataDescriptor>
</metadataMatches>
</searchMatchItem>
</matchList>

```
</CMSearchResult>
```

Note: the searched <playbackURI> will be used when download.

(5)Send *GET /ISAPI/ContentMgmt/download* to download a record segment.

The sending xml

```
<downloadRequest>
<playbackURI>
rtsp://10.10.39.14/Streaming/tracks/101?starttime=2014-06-18T22:30:30Z&amp;endtime=2014
-06-18T22:31:53Z&amp;name=ch01_08000000011002401&amp;size=638552
</playbackURI>
</downloadRequest>
```

Note: the <plackbackURI> here is just the same as searched result above.

The download size can't be changed by modifying the start time and end time because record is downloaded by searched files.

Therefore, another question: how to download files by size?

There are two methods for you to choose:

a) Save the required record size when play
   rtsp://10.10.39.32:554/ISAPI/streaming/tracks/101?starttime=20140611T105634Z&endtime=20140612T105729Z RTSP/1.0

Range:clock=20140611T105634Z-20140612T105729Z

b) Cutomize the firmware to support storing record of required size.
   Skywatch adopt the second method.