Bosch Metadata and IVA Events via ONVIF
IVA Events, Metadata and MIC 9000
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1 Scope

This document describes the usage of the Bosch edge Intelligent Video analysis (IVA) via the standard interface ONVIF. With ONVIF (Bosch FW 6.10 and higher) it is supported to receive Analysis Events based on the IVA rule engine on the edge and the metadata stream in the ONVIF format.


2 IVA Events via ONVIF

IVA Events via ONVIF are based on the IVA rule engine of the Bosch camera on the edge, the Bosch device supports up to eight IVA rules. The configuration of the rules needs to be done on the webpage of the device.

2.1 List of Supported IVA rules

- Object In Field
- Crossing Line
- Loitering
- Condition Change
- Following Route
- Removed Object
- Idle Object
- Entering Field
- Leaving Field
- Similarity Search
- Crowd Detection
- Counter (Alarm)

Supported Analytic AVIOTEC IP starlight 8000 (only available with this camera Model)

- Fire Alarm
- Smoke Alarm

ONVIF IVA event message contains the **video source** the **event type** and the **rule name** (see screenshot on page 3). All IVA events are part of the ONVIF request *GetEventProperties*, furthermore it is supported to dynamically create new IVA rules. In case a new IVA rule is created on the camera the *GetEventProperties* needs to request it by the ONVIF client again. Changes of created rules (eg. moving a crossing line etc.) do not require an update of the *GetEventProperties*.

**Note:** To be backward compatible all IVA events are transmitted as **motion alarm** event, too.
Example of IVA Event Messages:

<table>
<thead>
<tr>
<th>Analysis type</th>
<th>Event name</th>
<th>Video Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion</td>
<td>Object event in critical area</td>
<td>SourceToken 1</td>
</tr>
</tbody>
</table>

2.2 Configuration of OVA rules via the camera website

Camera webpage => Settings => Alarm => VCA => Configuration
3 ONVIF Metadata

3.1 Onvif Metadata Features coverage

With FW 6.10 and higher it is possible to receive metadata in the ONVIF format from Bosch cameras. The metadata contain following information for the bounding Boxes:

- Object coordinates
- Center of Gravity
- Object ID

With FW 6.40 the ONVIF Metadata support is extended by:

- Polygon points
- Class candidate *
  - Human
  - Car
  - Truck
  - Bike
- Likelihood
- Bounding box coordinates for AVIOTEC camera (Fire/Smoke)
- Source information (line) of object for MIC fusion 9000

With FW 6.50 the ONVIF Metadata support is extended by:

- Geolocation information of Objects
- velocity of the objects in [m/s] *
- area/size information in [qm] *
- Class candidate *
  - Class;
    - Human
    - Face
    - Vehicle’
    - Other
  - Extension (more details)
    - Head
    - Group
    - SmallObject
    - Fire
    - Smoke
    - Car
    - Bike
    - Truck
    - Other
- counter as an event (only in the metadata stream)
- Event to Object mapping
  The events show the object ID of the object, which triggered the event

*Camera needs to be calibrated via website or Bosch tools

Note: The ONVIF Metadata (MetadataConfig1) must be added manually to the ONVIF profile
Note: Due error in the ONVIF Metadata Spec ‘Vehicle’ is signaled as ‘Vehical’

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Dept./Business Unit
3.2 Example of the ONVIF Metadata stream:

3.3 Example of the ONVIF Metadata stream Event to Object Mapping
4 MIC fusion 9000

The Bosch MIC fusion contains a visible and a thermal camera and provides fusion of the Metadata of both cameras.

MIC IP fusion 9000i

Concept: Fusion of Metadata from both camera streams

It is supported to use the MIC fusion in two modes (fusion mode needs to be disabled on camera)

1. Two channel device with two separate metadata streams
   The camera behaves like a normal multi-channel device with two independent video and metadata streams

2. Fusion of visible and thermal metadata information
   The camera fuses (merges) the two metadata streams into one, with this, the operator can get the thermal metadata information in the visible video and the other way around. The source information of the origin of the object is part of the ONVIF metadata object information and indicated like this:
   a. None line information => Object was detected in the currently viewed stream
   b. Object line ‘X’ => Object was detected on the other stream number X

Example:
The thermal stream is viewed (stream #2) and an object is detected in the visible stream (stream #1).
5 Appendix

5.1 GetEventProperties Description

2. GetEventProperties

Description:
The WS-BaseNotification specification defines a set of OPTIONAL WS-ResourceProperties. The specification does not require the implementation of the WS-ResourceProperty interface. Instead, the subsequent direct interface shall be implemented by an ONVIF compliant device in order to provide information about the File:DataSets, Schema files, and topics supported by the device.

SOAP action:
http://www.onvif.org/ver10/events/wsdl/EventNotification/GetEventPropertiesRequest

Input:

Output:

<table>
<thead>
<tr>
<th>TopicExpressionSelector - unbounded: [anyURI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of topic namespaces supported.</td>
</tr>
<tr>
<td>False =&gt; IVA Rules can be changed dynamically</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Logical (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set of topics supported.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TopicExpressionSelector - unbounded: [TopicExpressionSelector]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the XPath expression syntax supported for matching topic expressions.</td>
</tr>
<tr>
<td>The following TopicExpressionSections are mandatory for an ONVIF compliant device:</td>
</tr>
<tr>
<td><a href="http://docs.oasis-open.org/wsn/c-1/TopicExpression/ConcreteFileSet">http://docs.oasis-open.org/wsn/c-1/TopicExpression/ConcreteFileSet</a></td>
</tr>
<tr>
<td><a href="http://www.onvif.org/ver10/events/topicExpression/ConcreteFileSet">http://www.onvif.org/ver10/events/topicExpression/ConcreteFileSet</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MessageContentFilterSelector - unbounded: [anyURI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defines the XPath function set supported for message content filtering.</td>
</tr>
<tr>
<td>The following MessageContentFilterSelectors should be returned if a device supports the message content filtering:</td>
</tr>
<tr>
<td><a href="http://www.onvif.org/ver10/events/messageContentFilterSelector_fileSet">http://www.onvif.org/ver10/events/messageContentFilterSelector_fileSet</a></td>
</tr>
<tr>
<td>A device that does not support any MessageContentFilterSelector returns a single empty url</td>
</tr>
</tbody>
</table>

Optional ProducerPropertiesSelector. Refer to "WS-BaseNotification 1.2 [WS-BaseNotification]" for advanced filtering.

<table>
<thead>
<tr>
<th>MessageContentSchemaLocation - unbounded: [anyURI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Message Content Description language allows referencing of vendor-specific types. In order to ease the integration of such types into a client application, the GetEventPropertiesResponse shall list all URI locations to schema files whose types are used in the description of notifications, with MessageContentSchemaLocation elements.</td>
</tr>
<tr>
<td>The list shall at least contain the URI of the ONVIF schema file.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>True when topic is fixed for all times</td>
</tr>
</tbody>
</table>

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5.2 Example of GetEventPropertiesResponse of IVA event

```xml
<GetEventPropertiesResponse>
  <topic:TopicSet>
    <topic:Device>
      <topic:IVA>
        <CollectiveField>
          <Detect_any_object xlink:topic="true">
            <MessageClassification xlink:property="true">
              <Source>
                <SimpleItemDescription Name="Source" Type="ReferenceToken"/>
              </Source>
              <Data/>
            </MessageClassification>
            <MessageDescription>
              <Detect_any_object/>
            </MessageDescription>
            <Detect_any_object/>
          </Detect_any_object>
          <Alarm_at_the_door xlink:topic="true">
            <MessageClassification xlink:property="true">
              <Source>
                <SimpleItemDescription Name="Source" Type="ReferenceToken"/>
              </Source>
              <Data/>
            </MessageClassification>
            <MessageDescription>
              <Alarm_at_the_door/>
            </MessageDescription>
            <Alarm_at_the_door/>
          </Alarm_at_the_door>
          <CrosstieLine xlink:topic="true">
            <MessageClassification xlink:property="true">
              <Source>
                <SimpleItemDescription Name="Source" Type="ReferenceToken"/>
              </Source>
              <Data/>
            </MessageClassification>
            <MessageDescription>
              <CrosstieLine/>
            </MessageDescription>
            <CrosstieLine/>
          </CrosstieLine>
          <Person_in_critical_area xlink:topic="true">
            <MessageClassification xlink:property="true">
              <Source>
                <SimpleItemDescription Name="Source" Type="ReferenceToken"/>
              </Source>
              <Data/>
            </MessageClassification>
            <MessageDescription>
              <Person_in_critical_area/>
            </MessageDescription>
            <Person_in_critical_area/>
          </Person_in_critical_area>
        </CollectiveField>
      </topic:IVA>
    </topic:Device>
  </topic:TopicSet>
</GetEventPropertiesResponse>
```
5.3 Add Metadata configuration to ONVIF profile