# ONVIF®

# Analytics Engine Device Test Specification

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# REVISION HISTORY

| Vers. | Date | Description |
|---|---|---|
| 17.06 | Mar 15, 2017 | First Issue. |
| 17.06 | Apr 18, 2017 | ANALYTICS-1-1-1 GET SUPPORTED RULES (MOTION REGION DETECTOR) added<br><br>ANALYTICS-1-1-2 GET MOTION REGION DETECTOR RULE OPTIONS added |
| 17.06 | May 23, 2017 | ANALYTICS-1-1-2 GET MOTION REGION DETECTOR RULE OPTIONS updated<br><br>ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE added |
| 17.06 | May 24, 2017 | ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE added<br><br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT added |
| 17.12 | Jul 24, 2017 | The following test cases were changed according to #1444:<br><br>ANALYTICS-1-1-2 GET MOTION REGION DETECTOR RULE OPTIONS<br><br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE<br><br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT |
| 17.12 | Jul 24, 2017 | The following test cases were changed according to #1445:<br><br>ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE<br><br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE<br><br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT |
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| 17.12 | Oct 16, 2017 | Pre-Requisite of the following test cases were updated according to #1185:<br><br>GET SUPPORTED RULES (MOTION REGION DETECTOR)<br><br>GET MOTION REGION DETECTOR RULE OPTIONS<br><br>CREATE MOTION REGION DETECTOR RULE<br><br>MODIFY MOTION REGION DETECTOR RULE<br><br>MOTION REGION DETECTOR EVENT |
| 17.12 | Nov 22, 2017 | The following test case was updated according to #1184:<br><br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT |
| 17.12 | Nov 28, 2017 | The following test cases were updated according to #1398: |

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|---|---|---|
| | | ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE<br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE<br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT<br>The following annexes were added according to #1398:<br>Annex A.8 Calculate Free Space for Rule<br>Annex A.9 Delete Rule with Requested Type<br>The following test cases were updated according to #1185:<br>ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE<br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE<br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT |
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| 18.06 | Jun 21, 2018 | Reformatting document using new template |
| 18.12 | Aug 16, 2018 | The following test cases were changed according to #1709:<br>ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE<br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE<br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT<br>Annex Create Motion Region Detector Rule |
| 18.12 | Sept 05, 2018 | The following test cases were changed according to #1733:<br>ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE (Note about comparison of Armed field changed)<br>ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE (Note about comparison of Armed field changed) |
| 18.12 | Oct 08, 2018 | The following test cases were changed according to #1665:<br>ANALYTICS-1-1-1 GET SUPPORTED RULES (MOTION REGION DETECTOR) (step 4.3.1 added) |
| 18.12 | Dec 21, 2018 | Switching Hub description in 'Network Configuration for DUT' section was updated according to #1737 |
| 18.12 | Dec 27, 2018 | Check of @Type in GetRuleOptionsResponse was changed in the following test cases according to #1774:<br>GET MOTION REGION DETECTOR RULE OPTIONS<br>CREATE MOTION REGION DETECTOR RULE |

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| | | MODIFY MOTION REGION DETECTOR RULE<br>MOTION REGION DETECTOR EVENT |
| 19.12 | Apr 26, 2019 | The following was changed according to #1833:<br>Scope (Analytics Engine section was replaced with the following sections: Motion Region Detector, Events, Capabilities)<br>Scope (Analytics Modules section was added)<br>Test Policy (Analytics Modules section was added)<br>Analytics Engine (Analytics Modules section was added) |
| 19.12 | Oct 18, 2019 | The following was changed according to #1831:<br>Introduction (Analytics Modules section was updated)<br>Test Policy (Analytics Modules section was updated)<br>ANALYTICS-4-1-4 Get Supported Metadata (added)<br>ANALYTICS-3-1-1 Get Services and Get Analytics Service Capabilities Consistency (updated with adding of Note)<br>ANALYTICS-3-1-2 Analytics Service Capabilities (added)<br>Annex A.13 Get Installed Analytics Modules (added)<br>Annex A.14 Get Supported Metadata (added) |
| 19.12 | Oct 23, 2019 | The following was changed according to #1837:<br>ANALYTICS-4-1-5 Object Class Descriptor (added) |
| 20.06 | Jan 16, 2020 | The following was changed according to #1841:<br>ANALYTICS-5-1-2 Vehicle Information Descriptor (added)<br>The following was changed according to #1845:<br>ANALYTICS-5-1-3 Geo Location Metadata (added) |
| 20.06 | Jan 17, 2020 | The following was changed according to #1953:<br>ANALYTICS-4-1-5 Create Analytics Modules (added)<br>ANALYTICS-4-1-6 Delete Analytics Modules (added)<br>ANALYTICS-4-1-7 Modify Analytics Modules (added) |
| 20.06 | Feb 10, 2020 | The following was changed according to #1820:<br>ANALYTICS-5-1-4 Human Face Descriptor (added)<br>The following was changed according to #1843:<br>ANALYTICS-5-1-5 License Plate Information Descriptor (added)<br>The following was changed according to #1839:<br>ANALYTICS-5-1-6 Human Body Descriptor (added) |
| 20.06 | Mar 17, 2020 | The following was changed according to #1835: |

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| | | ANALYTICS-5-1-7 Image Data (added) |
| 20.06 | Apr 16, 2020 | The following test cases were updated according to #2037:<br>ANALYTICS-5-1-4 Human Face Descriptor<br>ANALYTICS-5-1-5 License Plate Information Descriptor<br>ANALYTICS-5-1-6 Human Body Descriptor |
| 20.06 | May 13, 2020 | The following was changed according to #1999:<br>ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT (step 21, 26 updated) |
| 20.06 | Jun 15, 2020 | The following was changed according to #2018:<br>ANALYTICS-4-1-4 GET SUPPORTED METADATA (step 7.2, 8.8 added) |

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# 1 Introduction

The goal of the ONVIF test specification set is to make it possible to realize fully interoperable IP physical security implementation from different vendors. The set of ONVIF test specification describes the test cases need to verify the [ONVIF Network Interface Specs] and [ONVIF Conformance] requirements. In addition, the test cases are to be basic inputs for some Profile specification requirements. It also describes the test framework, test setup, pre-requisites, test policies needed for the execution of the described test cases.

This ONVIF Analytics Engine Test Specification acts as a supplementary document to the [ONVIF Network Interface Specs], illustrating test cases need to be executed and passed. And this specification acts as an input document to the development of test tool, which will be used to test the ONVIF device implementation conformance towards ONVIF standard. This test tool is referred as ONVIF Client hereafter.

## 1.1 Scope

This ONVIF Analytics Engine Test Specification defines and regulates the conformance testing procedure for the ONVIF conformant devices. Conformance testing is meant to be functional black-box testing. The objective of this specification to provide test cases to test individual requirements of ONVIF devices according to ONVIF Analytics service(s) which is defined in [ONVIF Network Interface Specs].

The principal intended purposes are:

- Provide self-assessment tool for implementations.
- Provide comprehensive test suite coverage for [ONVIF Network Interface Specs].

This specification **does not** address the following:

- Product use cases and non-functional (performance and regression) testing.
- SOAP Implementation Interoperability test i.e. Web Service Interoperability Basic Profile version 2.0 (WS-I BP 2.0).
- Network protocol implementation Conformance test for HTTP, HTTPS, RTP and RTSP protocol.
- Poor streaming performance test (audio/video distortions, missing audio/video frames, incorrect lib synchronization etc.).

  Wi-Fi Conformance test

The set of ONVIF Test Specification will not cover the complete set of requirements as defined in [ONVIF Network Interface Specs]; instead, it will cover its subset.

This ONVIF Analytics Engine Test Specification covers Analytics Service, which is a functional block of [ONVIF Network Interface Specs]. The following section gives a brief overview of each functional block and its scope.

## 1.2 Motion Region Detector

Motion Region Detector test cases cover verification of Rule interface for Motion Region Detector feature as mentioned in [ONVIF Analytics Spec]. It means that the following commands are covered by these test cases:

- GetSupportedRules (for Motion Region Detector Rule scope only);
- CreateRules (for Motion Region Detector Rule scope only);
- ModifyRules (for Motion Region Detector Rule scope only);
- DeleteRules (for Motion Region Detector Rule scope only);
- GetRules (for Motion Region Detector Rule scope only).

## 1.3 Events

Events test cases cover verification of property events defined in [ONVIF Analytics Spec]. Currently the following events are covered by these test cases:

- tns1:RuleEngine/MotionRegionDetector/Motion.

## 1.4 Capabilities

Capabilities test cases cover verification to get Analytics Service capabilities. It means that the following commands are covered by these test cases:

- GetServices (Analytics Service);
- GetServiceCapabilities.

## 1.5 Analytics Modules

Analytics Modules test cases cover verification of analytics modules configuration feature as mentioned in [ONVIF Analytics Spec]. It means that the following commands are covered by these test cases:

- GetSupportedAnalyticsModules;
- GetAnalyticsModules;
- GetAnalyticsModuleOptions;
- GetSupportedMetadata;
- CreateAnalyticsModules;
- DeleteAnalyticsModules;
- ModifyAnalyticsModules.

## 1.6 Scene Elements

Scene Elements test cases cover verification of scene elements in supported metadata as mentioned in [ONVIF Analytics Spec]. It means that the following features are covered by these test cases:

- Object Classification descriptor;
- Vehicle information descriptor;
- Human Face descriptor;
- Human Body descriptor;
- License plate information descriptor;
- Geo location metadata;
- GetSupportedMetadata;
- Image Data.

# 2 Normative references

- [ONVIF Conformance] ONVIF Conformance Process Specification:
  https://www.onvif.org/profiles/conformance/
- [ONVIF Profile Policy] ONVIF Profile Policy:
  https://www.onvif.org/profiles/
- [ONVIF Network Interface Specs] ONVIF Network Interface Specification documents:
  https://www.onvif.org/profiles/specifications/
- [ONVIF Core Specs] ONVIF Core Specification:
  https://www.onvif.org/profiles/specifications/
- [ONVIF Media2 Spec] ONVIF Media 2 Specification:
  https://www.onvif.org/profiles/specifications/
- [ONVIF Analytics Spec] ONVIF Analytics Specification:
  https://www.onvif.org/profiles/specifications/
- [ONVIF Base Test] ONVIF Base Device Test Specification:
  https://www.onvif.org/profiles/conformance/device-test/
- [ISO/IEC Directives, Part 2] ISO/IEC Directives, Part 2, Annex H:
  http://www.iso.org/directives
- [ISO 16484-5] ISO 16484-5:2014-09 Annex P:
  https://www.iso.org/obp/ui/#!iso:std:63753:en
- [SOAP 1.2, Part 1] W3C SOAP 1.2, Part 1, Messaging Framework:
  http://www.w3.org/TR/soap12-part1/
- [XML-Schema, Part 1] W3C XML Schema Part 1: Structures Second Edition:
  http://www.w3.org/TR/xmlschema-1/
- [XML-Schema, Part 2] W3C XML Schema Part 2: Datatypes Second Edition:
  http://www.w3.org/TR/xmlschema-2/

- [WS-Security] "Web Services Security: SOAP Message Security 1.1 (WS-Security 2004)", OASIS Standard, February 2006.:

  http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf

# 3 Terms and Definitions

## 3.1 Conventions

The key words "shall", "shall not", "should", "should not", "may", "need not", "can", "cannot" in this specification are to be interpreted as described in [ISO/IEC Directives Part 2].

## 3.2 Definitions

This section describes terms and definitions used in this document.

| | |
|---|---|
| **Profile** | See ONVIF Profile Policy. |
| **ONVIF Device** | Computer appliance or software program that exposes one or multiple ONVIF Web Services. |
| **ONVIF Client** | Computer appliance or software program that uses ONVIF Web Services. |
| **Media Profile** | A media profile maps a video and/or audio source to a video and/or an audio encoder, PTZ and analytics configurations. |
| **SOAP** | SOAP is a lightweight protocol intended for exchanging structured information in a decentralized, distributed environment. It uses XML technologies to define an extensible messaging framework providing a message construct that can be exchanged over a variety of underlying protocols. |
| **Device Test Tool** | ONVIF Device Test Tool that tests ONVIF Device implementation towards the ONVIF Test Specification set. |
| **Video Analytics** | Algorithms used to evaluate video data for meaning of content. |
| **Audio Analytics** | Algorithms used to evaluate audio data for meaning of content. |

## 3.3 Abbreviations

This section describes abbreviations used in this document.

**HTTP** Hyper Text Transport Protocol.

**WSDL** Web Services Description Language.

**XML** eXtensible Markup Language.

**PTZ** Pan/Tilt/Zoom.

# 4 Test Overview

This section describes about the test setup and prerequisites needed, and the test policies that should be followed for test case execution.

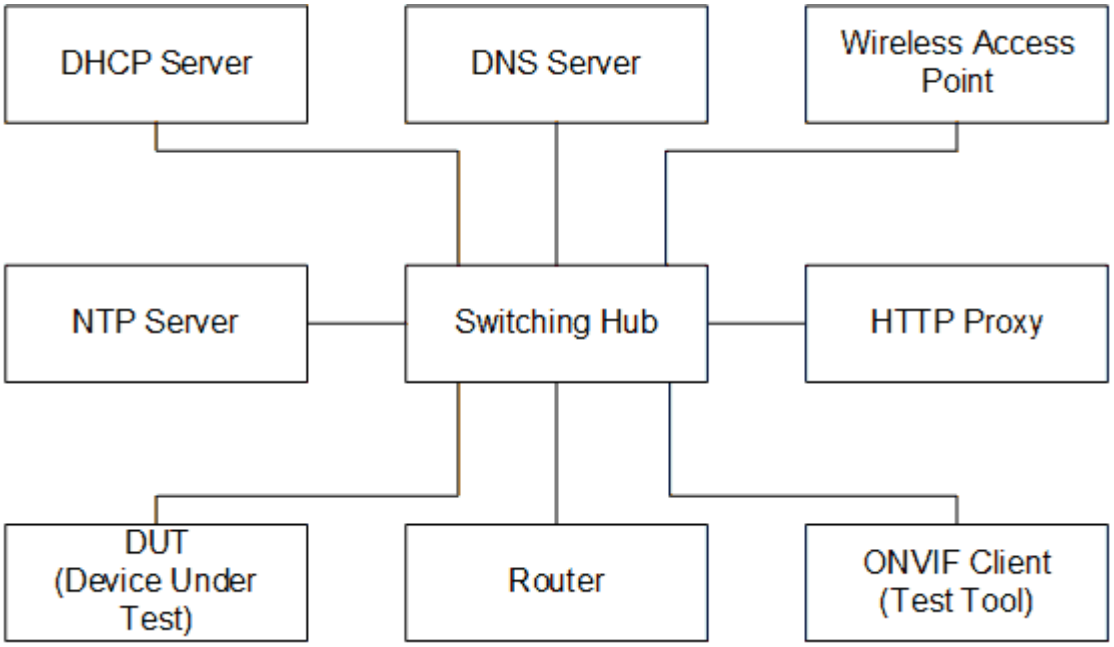
## 4.1 Test Setup

### 4.1.1 Network Configuration for DUT

The generic test configuration for the execution of test cases defined in this document is as shown below (Figure 4.1).

Based on the individual test case requirements, some of the entities in the below setup may not be needed for the execution of those corresponding test cases.

**Figure 4.1. Test Configuration for DUT**




**DUT:** ONVIF device to be tested. Hereafter, this is referred to as DUT (Device Under Test).

**ONVIF Client (Test Tool):** Tests are executed by this system and it controls the behavior of the DUT. It handles both expected and unexpected behavior.

**HTTP Proxy:** provides facilitation in case of RTP and RTSP tunneling over HTTP.

**Wireless Access Point:** provides wireless connectivity to the devices that support wireless connection.

**DNS Server:** provides DNS related information to the connected devices.

**DHCP Server:** provides IPv4 Address to the connected devices.

**NTP Server:** provides time synchronization between ONVIF Client and DUT.

**Switching Hub:** provides network connectivity among all the test equipments in the test environment. All devices should be connected to the Switching Hub. When running multiple test instances in parallel on the same network, the Switching Hub should be configured to use filtering in order to avoid multicast traffic being flooded to all ports, because this may affect test stability.

**Router:** provides router advertisements for IPv6 configuration.

## 4.2 Prerequisites

The pre-requisites for executing the test cases described in this Test Specification are:

1. The DUT shall be configured with an IPv4 address.
2. The DUT shall be IP reachable [in the test configuration].
3. The DUT shall be able to be discovered by the Test Tool.
4. The DUT shall be configured with the time i.e. manual configuration of UTC time and if NTP is supported by the DUT, then NTP time shall be synchronized with NTP Server.
5. The DUT time and Test tool time shall be synchronized with each other either manually or by common NTP server

## 4.3 Test Policy

This section describes the test policies specific to the test case execution of each functional block.

The DUT shall adhere to the test policies defined in this section.

### 4.3.1 Motion Region Detector

The test policies specific to the test case execution of Motion Region Detector functional block:

- DUT shall give the Analytics Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall give the Media2 Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall provide Motion Region Detector rule, if DUT supports this rule. Otherwise, these test cases will be skipped.

- DUT shall support the following commands:
  - GetServiceCapabilities
- If DUT returns RuleSupport capability as supported, then DUT shall support commands listed below. Otherwise, these test cases will be skipped.
  - GetServiceCapabilities
  - GetSupportedRules
  - GetRules
  - CreateRules
  - ModifyRules
  - DeleteRules
- If DUT returns RuleOptionsSupported capability as supported, then DUT shall support GetRuleOptions command. Otherwise, the following test cases will be skipped:
  - GET MOTION REGION DETECTOR RULE OPTIONS
  - MODIFY MOTION REGION DETECTOR RULE

Please, refer to Section 5.1 for Motion Region Detector Test Cases.

### 4.3.2 Events

The test policies specific to the test case execution of Events functional block::

- DUT shall give the Analytics Service entry point and Event Service entry points by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall give the Media2 Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall provide Motion Region Detector rule, if DUT supports this rule. Otherwise, these test cases will be skipped.
- DUT shall provide tns1:RuleEngine/MotionRegionDetector/Motion notification topic and Initialized event, if DUT supports Motion Region Detector rule. Otherwise, these test cases will be skipped.
- DUT shall support the following commands:

- GetServiceCapabilities
- GetEventProperties
- CreatePullPointSubscription
- PullMessages
- Unsubscribe

- If DUT returns RuleSupport capability as supported, then DUT shall support commands listed below. Otherwise, these test cases will be skipped.
  - GetServiceCapabilities
  - GetSupportedRules
  - CreateRules
  - DeleteRules
- If DUT returns RuleOptionsSupported capability as supported, then DUT shall support GetRuleOptions command. Otherwise, these test cases will be skipped.

Please, refer to Section 5.2 for Motion Region Detector Test Cases.

### 4.3.3 Capabilities

The test policies specific to the test case execution of Capabilities functional block:

- DUT shall give the Analytics Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall support the following commands:
  - GetServices
  - GetServiceCapabilities
- The following tests are performed
  - Getting capabilities with GetServiceCapabilities command
  - Getting capabilities with GetServices command

Please refer to Section 5.3 for Capabilities Test Cases.

### 4.3.4 Analytics Modules

The test policies specific to the test case execution of Analytics Modules functional block:

- DUT shall give the Analytics Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- DUT shall support the following commands:
  - GetSupportedAnalyticsModules
  - GetAnalyticsModules
  - GetAnalyticsModuleOptions
  - GetSupportedMetadata
  - CreateAnalyticsModules
  - DeleteAnalyticsModules
  - ModifyAnalyticsModules
- Additionally, DUT shall support the following commands which will be used as supplementary during the testing:
  - GetServices
- DUT shall return all supported analytics modules in GetSupportedAnalyticsModulesResponse response for the video analytics configuration specified in GetSupportedAnalyticsModules request.
- If DUT supports Supported Metadata as indicated by the Capabilities.SupportedMetadata, then DUT shall support the following commands
  - GetSupportedMetadata
- DUT shall indicate maximum number of analytics modules through the maxInstances attribute in GetSupportedAnalyticsModulesResponse.
- DUT shall return unique names of the parameters for each supported analytics modules in GetSupportedAnalyticsModulesResponse response.
- DUT shall return unique names of the messages for each supported analytics modules in GetSupportedAnalyticsModulesResponse response.
- DUT shall return valid parent topic value for each supported analytics modules in GetSupportedAnalyticsModulesResponse response.

- DUT shall return all configured analytics modules in GetAnalyticsModulesResponse response for the video analytics configuration specified in GetAnalyticsModules request.
- DUT shall return all analytics modules, which marked as fixed in GetSupportedAnalyticsModulesResponse response, in GetAnalyticsModulesResponse response for the video analytics configuration specified in GetAnalyticsModules request.
- If DUT shall return configured analytics modules in GetAnalyticsModulesResponse response whith the structure defined in GetSupportedAnalyticsModulesResponse response for the corresponding analytics module type.
- If DUT supports receiving of analitics module options as indicated by AnalyticsModuleOptionsSupported capability:
  - DUT shall return options for all parameters of all supported analytics modules in GetAnalyticsModuleOptionsResponse response for the video analytics configuration specified in GetAnalyticsModuleOptions request, if Type is skipped.
  - DUT shall return options for all parameters in GetAnalyticsModuleOptionsResponse response for the video analytics configuration and supported analytics module specified in GetAnalyticsModuleOptions request.
  - DUT shall not return RuleType for any option in GetAnalyticsModuleOptionsResponse response.
- The following tests are performed:
  - Receiving of supported analytics modules for each video analytics configuration.
  - Receiving of all configured analytics modules for each video analytics configuration.
  - Verifying of consistency between configured analytics modules and supported analytics modules description.
  - If DUT supports receiving of analitics module options as indicated by AnalyticsModuleOptionsSupported capability:
    - Receiving of all analytics module options for each video analytics configuration.
    - Receiving of analytics module options for specified analytics module type for each video analytics configuration.
    - Verifying of consistency between analytics module options and supported analytics modules description.

- If DUT supports receiving of supported metadata as indicated by SupportedMetadata capability:
  - Receiving of supported metadata for each installed module type.

Please refer to Section 5.4 for Analytics Modules Test Cases.

### 4.3.5 Scene Elements

The test policies specific to the test case execution of Capabilities functional block:

- DUT shall give the Analytics Service entry point by GetServices command, if DUT supports this service. Otherwise, these test cases will be skipped.
- If DUT supports Supported Metadata as indicated by the Capabilities.SupportedMetadata, then DUT shall support the following commands
  - GetSupportedMetadata
- The following tests are performed
  - Getting supported metadata with GetSupportedMetadata command;
  - Check that sum of Likelihood of Object is not greater than 1;
  - Check Vehicle Information Descriptor in Supported Metadata;
  - Check Geo Location Metadata in Supported Metadata;
  - Check Human Face Descriptor in Supported Metadata;
  - Check Human Body Descriptor in Supported Metadata;
  - Check License Plate Information Descriptor in Supported Metadata;
  - Check Image Data in Supported Metadata;

Please refer to Section 5.5 for Scene Elements Test Cases.

# 5 Analytics Engine

## 5.1 Motion Region Detector

### 5.1.1 GET SUPPORTED RULES (MOTION REGION DETECTOR)

**Test Case ID:** ANALYTICS-1-1-1

**Specification Coverage:** Get Supported rules (ONVIF Analytics Service Spec), Motion Region Detector (ONVIF Analytics Service Spec)

**Feature Under Test:** GetSupportedRules, RuleDescription for tt:MotionRegionDetector

**WSDL Reference:** analytics.wsdl, media2.wsdl

**Test Purpose:** To verify that device includes tt:MotionRegionDetector in GetSupportedRulesResponse. To verify structure of Motion Region Detector.

**Pre-Requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities. Motion Region Detector Rule is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
4. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   4.1. ONVIF Client invokes **GetSupportedRules** request with parameters
      - ConfigurationToken := *analyticsConf.*@token
   4.2. DUT responds with **GetSupportedRulesResponse** message with parameters
      - SupportedRules =: *supportedRules*

4.3. If *supportedRules* contains RuleDescription element (*motionRegionDetectorRuleDescription*) with Name value is equal to **tt:MotionRegionDetector**:

4.3.1. If *motionRegionDetectorRuleDescription* does not have maxInstances attribute, FAIL the test and skip other steps.

4.3.2. If *motionRegionDetectorRuleDescription* does not have Parameters.ElementItemDescription element with Name attribute value is equal to "MotionRegion", FAIL the test and skip other steps.

4.3.3. If Type attribute value is not equal to "axt:MotionRegionConfig" for *motionRegionDetectorRuleDescription*.Parameters.ElementItemDescription with Name attribute value is equal to "MotionRegion", FAIL the test and skip other steps.

4.3.4. If *motionRegionDetectorRuleDescription* does not have Messages.Source.SimpleItemDescription element with Name attribute value is equal to "VideoSource", FAIL the test and skip other steps.

4.3.5. If Type attribute value is not equal to "tt:ReferenceToken" for *motionRegionDetectorRuleDescription*.Messages.Source.SimpleItemDescription with Name attribute value is equal to "VideoSource", FAIL the test and skip other steps.

4.3.6. If *motionRegionDetectorRuleDescription* does not have Messages.Source.SimpleItemDescription element with Name attribute value is equal to "RuleName", FAIL the test and skip other steps.

4.3.7. If Type attribute value is not equal to "xs:string" for *motionRegionDetectorRuleDescription*.Messages.Source.SimpleItemDescription with Name attribute value is equal to "RuleName", FAIL the test and skip other steps.

4.3.8. If *motionRegionDetectorRuleDescription* does not have Messages.Data.SimpleItemDescription element with Name attribute value is equal to "State", FAIL the test and skip other steps.

4.3.9. If Type attribute value is not equal to "xs:boolean" for *motionRegionDetectorRuleDescription*.Messages.Data.SimpleItemDescription with Name attribute value is equal to "State", FAIL the test and skip other steps.

4.3.10. If Messages.ParentTopic value is not equal to "tns1:RuleEngine/MotionRegionDetector/Motion" for Messages with Source.SimpleItemDescription.Name value is equal to VideoSource and with Source.SimpleItemDescription.Name value is equal to RuleName, FAIL the test and skip other steps.

5. If there was no RuleDescription element with Name value is equal to **tt:MotionRegionDetector** in at least one *supportedRules* at step 4.2 [23], FAIL the test.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedRulesResponse** message.

## 5.1.2 GET MOTION REGION DETECTOR RULE OPTIONS

**Test Case ID:** ANALYTICS-1-1-2

**Specification Coverage:** Get Rule Options (ONVIF Analytics Service Spec), Motion Region Detector (ONVIF Analytics Service Spec)

**Feature Under Test:** GetRuleOptions, MotionRegionConfigOptions

**WSDL Reference:** analytics.wsdl, media2.wsdl

**Test Purpose:** To verify retrieving of MotionRegionConfigOptions by GetRuleOptions operation.

**Pre-Requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities, Rule Options is supported by the Device as indicated by the RuleOptionsSupported capabilities. Motion Region Detector Rule is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.

3. ONVIF Client retrieves a list of Analytics Configurations that supports tt:MotionRegionDetector type by following the procedure mentioned in Annex A.2 with the following input and output parameters

   - in **tt:MotionRegionDetector** - rule type
   - out *analyticsConfListWithSupportingOfMotionRegionDetector* - a list of Analytics configurations

4. If *analyticsConfListWithSupportingOfMotionRegionDetector* is empty, FAIL the test and skip other steps.

5. For each Analytics Configuration *analyticsConf* in *analyticsConfListWithSupportingOfMotionRegionDetector* repeat the following steps:

   5.1. ONVIF Client invokes **GetRuleOptions** request with parameters

   - RuleType := tt:MotionRegionDetector
   - ConfigurationToken := *analyticsConf*.@token

   5.2. DUT responds with **GetRuleOptionsResponse** message with parameters

   - RuleOptions list =: *ruleOptionsList*

   5.3. If *ruleOptionsList* does not contain RuleOption with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present), FAIL the test and skip other steps.

   5.4. If RuleOption element with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present) does not contain **MotionRegionConfigOptions** element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetRuleOptionsResponse** message.

## 5.1.3 CREATE MOTION REGION DETECTOR RULE

**Test Case ID:** ANALYTICS-1-1-3

**Specification Coverage:** Create Rules (ONVIF Analytics Service Spec)

**Feature Under Test:** Create Rules

**WSDL Reference:** analytics.wsdl, media2.wsdl

**Test Purpose:** To verify adding of Motion Region Detector Rule to an AnalyticsConfiguration by CreateRules operation.

**Pre-Requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Rule Engine is supported by the DUT as indicated by the RuleSupport capabilities. Motion Region Detector Rule is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations that supports tt:MotionRegionDetector type by following the procedure mentioned in Annex A.2 with the following input and output parameters
   - in **tt:MotionRegionDetector** - rule type
   - out *analyticsConfListWithSupportingOfMotionRegionDetector* - a list of Analytics configurations
4. If *analyticsConfListWithSupportingOfMotionRegionDetector* is empty, FAIL the test and skip other steps.
5. ONVIF Client configures media profile with Analytics Configuration from *analyticsConfListWithSupportingOfMotionRegionDetector* list by following the procedure mentioned in Annex A.4 with the following input and output parameters
   - in *analyticsConfListWithSupportingOfMotionRegionDetector* - list of Analytics configurations.
   - out *profile* - media profile.
6. ONVIF Client retrieves Rule Options of tt:MotionRegionDetector type by following the procedure mentioned in Annex A.3 with the following input and output parameters
   - in **tt:MotionRegionDetector** - Rule type
   - in *profile*.Configurations.Analytics - Analytics Configuration

- out *ruleOptions* - Rule Options

7. If *ruleOptionsList* does not contain RuleOption with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present), FAIL the test and skip other steps.
8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** (if @Type is present) does not contain **MotionRegionConfigOptions** element, FAIL the test and skip other steps.
9. Set *motionRegionConfigOptions* := RuleOption[0].MotionRegionConfigOptions, where RuleOption[0] is element with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present).
10. ONVIF Client calculates free space for adding of new rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.8 with the following input and output parameters
    - in **tt:MotionRegionDetector** - rule type
    - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
    - out *maxInstances* - flag if maxInstances is supported.
    - out *amountOfAdditionalRules* - amount of additiona rules.
11. If *amountOfAdditionalRules* > 0 or *maxInstances*=false, go to step 13 [28].
12. ONVIF Client deletes rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.9 with the following input and output parameters
    - in **tt:MotionRegionDetector** - rule type
    - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
13. ONVIF Client invokes **CreateRules** request with parameters
    - ConfigurationToken := *profile*.Configurations.Analytics.@token
    - Rule[0].@Name := TestMotionRegion
    - Rule[0].@Type := tt:MotionRegionDetector
    - Rule[0].Parameters.ElementItem[0].@Name := "MotionRegion"
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@x := *profile*.Configurations.VideoSource.Bounds.@x

- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@x := *profile*.Configurations.VideoSource.Bounds.@x
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Armed := true if *motionRegionConfigOptions*.DisarmSupport = true, otherwise skipped.
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Sensitivity := 1

14. The DUT responds with **CreateRulesResponse** or with SOAP fault response.
15. If DUT responded with SOAP fault response:
    15.1. If *maxInstances* = true, fail the test and skip other steps.
    15.2. ONVIF Client deletes rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.9 with the following input and output parameters
        - in **tt:MotionRegionDetector** - rule type
        - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
    15.3. ONVIF Client invokes **CreateRules** request with parameters
        - ConfigurationToken := *profile*.Configurations.Analytics.@token

- Rule[0].@Name := TestMotionRegion
- Rule[0].@Type := tt:MotionRegionDetector
- Rule[0].Parameters.ElementItem[0].@Name := "MotionRegion"
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@x := *profile*.Configurations.VideoSource.Bounds.@x
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@x := *profile*.Configurations.VideoSource.Bounds.@x
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Armed := true if *motionRegionConfigOptions*.DisarmSupport = true, otherwise skipped.
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Sensitivity := 1

15.4. The DUT responds with **CreateRulesResponse**.

16. ONVIF Client retrieves updated Rule list by following the procedure mentioned in Annex A.5 with the following input and output parameters

- in *profile*.Configurations.Analytics.@token - Analytics configuration token

- out *updatedRuleList* - Rule list.

17. If *updatedRuleList* does not contain Rule with @Name = TestMotionRegion and with Type = tt:MotionRegionDetector, FAIL the test and skip other steps.
18. Set *rule* := Rule with @Name = TestMotionRegion and with Type = tt:MotionRegionDetector from *updatedRuleList*.
19. If *rule*.Parameters does not contain ElementItem with @Name = "MotionRegion", FAIL the test and skip other steps.
20. If *rule*.Parameters.ElementItem with @Name = "MotionRegion" is not equal to Parameters.ElementItem[0] element from step 13 [28], FAIL the test and skip other steps.
21. ONVIF Client invokes **DeleteRules** request with parameters
    - ConfigurationToken := *profile*.Configurations.Analytics.@token
    - RuleName := TestMotionRegion
22. The DUT responds with **DeleteRulesResponse**.
23. ONVIF Client retrieves updated Rule list by following the procedure mentioned in Annex A.5 with the following input and output parameters
    - in *profile*.Configurations.Analytics.@token - Analytics configuration token
    - out *updatedRuleList* - Rule list.
24. If *updatedRuleList* contains Rule with @Name = TestMotionRegion and with Type = tt:MotionRegionDetector, FAIL the test and skip other steps.
25. ONVIF Client restores rule if it was deleted at step 12 [28] and at step 15.2 [29].
26. ONVIF Client restores media profile if it was changed at step 5 [27].

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **CreateRulesResponse** message.
- DUT did not send **DeleteRules** message.

**Note:** The following fields are compared at step 20 [31]:

- MotionRegion.Polygon.Point[0].@x
- MotionRegion.Polygon.Point[0].@y
- MotionRegion.Polygon.Point[1].@x
- MotionRegion.Polygon.Point[1].@y
- MotionRegion.Polygon.Point[2].@x
- MotionRegion.Polygon.Point[2].@y
- MotionRegion.Polygon.Point[3].@x
- MotionRegion.Polygon.Point[3].@y
- If **CreateRules** request contained Armed filed:
  - MotionRegion.@Armed
- MotionRegion.@Sensitivity

## 5.1.4 MODIFY MOTION REGION DETECTOR RULE

**Test Case ID:** ANALYTICS-1-1-4

**Specification Coverage:** Get Rule Options (ONVIF Analytics Service Spec), Modify Rules (ONVIF Analytics Service Spec)

**Feature Under Test:** Modify Rules

**WSDL Reference:** analytics.wsdl, media2.wsdl

**Test Purpose:** To verify modifying of Motion Region Detector Rule by ModifyRules operation.

**Pre-Requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capability. Rule Options is supported by the Device as indicated by the RuleOptionsSupported capability. Motion Region Detector Rule is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.

3. ONVIF Client retrieves a list of Analytics Configurations that supports tt:MotionRegionDetector type by following the procedure mentioned in Annex A.2 with the following input and output parameters
   - in **tt:MotionRegionDetector** - rule type
   - out *analyticsConfListWithSupportingOfMotionRegionDetector* - a list of Analytics configurations
4. If *analyticsConfListWithSupportingOfMotionRegionDetector* is empty, FAIL the test and skip other steps.
5. ONVIF Client configure media profile with Analytics Configuration from *analyticsConfListWithSupportingOfMotionRegionDetector* list by following the procedure mentioned in Annex A.4 with the following input and output parameters
   - in *analyticsConfListWithSupportingOfMotionRegionDetector* - list of Analytics configurations.
   - out *profile* - media profile.
6. ONVIF Client retrieves Rule Options of tt:MotionRegionDetector type by following the procedure mentioned in Annex A.3 with the following input and output parameters
   - in **tt:MotionRegionDetector** - Rule type
   - in *profile*.Configurations.Analytics - Analytics Configuration
   - out *ruleOptions* - Rule Options
7. If *ruleOptionsList* does not contain RuleOption with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present), FAIL the test and skip other steps.
8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** (if @Type is present) does not contain **MotionRegionConfigOptions** element, FAIL the test and skip other steps.
9. Set *motionRegionConfigOptions* := RuleOption[0].MotionRegionConfigOptions, where RuleOption[0] is element with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present).
10. ONVIF Client creates Motion Region Detector Rule by following the procedure mentioned in Annex A.10 with the following input parameter
    - in *profile* - media profile.

- in *motionRegionConfigOptions* - motion region configuration option.

11. ONVIF Client invokes **ModifyRules** request with parameters
    - ConfigurationToken := *profile*.Configurations.Analytics.@token
    - Rule[0].@Name := TestMotionRegion
    - Rule[0].@Type := tt:MotionRegionDetector
    - Rule[0].Parameters.ElementItem[0].@Name := "MotionRegion"
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@x := *profile*.Configurations.VideoSource.Bounds.@x
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@y := *profile*.Configurations.VideoSource.Bounds.@y
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@x := *profile*.Configurations.VideoSource.Bounds.@x
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@y := [(*profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1)/2]
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@x := [(*profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1)/2]
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@y := [(*profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1)/2]
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@x := [(*profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1)/2]
    - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@y := *profile*.Configurations.VideoSource.Bounds.@y
    - Rule[0].Parameters.ElementItem[0].MotionRegion.@Armed := false if *motionRegionConfigOptions*.DisarmSupport = true, otherwise skipped.
    - Rule[0].Parameters.ElementItem[0].MotionRegion.@Sensitivity := 0
12. The DUT responds with **ModifyRulesResponse**.

13. ONVIF Client retrieves updated Rule list by following the procedure mentioned in Annex A.5 with the following input and output parameters
    - in *profile*.Configurations.Analytics.@token - Analytics configuration token
    - out *updatedRuleList* - Rule list.
14. If *updatedRuleList* does not contain Rule with @Name = **"TestMotionRegion"** and with Type = **tt:MotionRegionDetector**, FAIL the test and skip other steps.
15. Set *rule* := Rule with @Name = "TestMotionRegion" and with Type = tt:MotionRegionDetector from *updatedRuleList*.
16. If *rule*.Parameters does not contain ElementItem with @Name = "MotionRegion", FAIL the test and skip other steps.
17. If *rule*.Parameters.ElementItem with @Name = **"MotionRegion"** is not equal to Parameters.ElementItem[0] element from step 11 [34], FAIL the test and skip other steps.
18. ONVIF Client invokes **DeleteRules** request with parameters
    - ConfigurationToken := *profile*.Configurations.Analytics.@token
    - RuleName := TestMotionRegion
19. The DUT responds with **DeleteRulesResponse**.
20. ONVIF Client restores rule if it was deleted at step 10 [33].
21. ONVIF Client restores media profile if it was changed at step 5 [33].

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **CreateRulesResponse** message.
- DUT did not send **ModifyRulesResponse** message.
- DUT did not send **DeleteRules** message.

**Note:** Symbol [] at step 10 [33] means integer part of value (floor function).

**Note:** The following fields are compared at step 17 [35]:

- MotionRegion.Polygon.Point[0].@x
- MotionRegion.Polygon.Point[0].@y
- MotionRegion.Polygon.Point[1].@x
- MotionRegion.Polygon.Point[1].@y
- MotionRegion.Polygon.Point[2].@x
- MotionRegion.Polygon.Point[2].@y
- MotionRegion.Polygon.Point[3].@x
- MotionRegion.Polygon.Point[3].@y
- If **ModifyRules** request contained Armed filed:
  - MotionRegion.@Armed
- MotionRegion.@Sensitivity

## 5.2 Events

### 5.2.1 MOTION REGION DETECTOR EVENT

**Test Case ID:** ANALYTICS-2-1-1

**Specification Coverage:** Motion Region Detector (ONVIF Analytics Service Spec)

**Feature Under Test:** tns1:RuleEngine/MotionRegionDetector/Motion

**WSDL Reference:** analytics.wsdl, media2.wsdl

**Test Purpose:** To verify tns1:RuleEngine/MotionRegionDetector/Motion event format. To verify event generation for tns1:RuleEngine/MotionRegionDetector/Motion.

**Pre-Requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capability. Rule Options is supported by the Device as indicated by the RuleOptionsSupported capability. Motion Region Detector Rule is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT.

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations that supports tt:MotionRegionDetector type by following the procedure mentioned in Annex A.2 with the following input and output parameters
   - in **tt:MotionRegionDetector** - rule type
   - out *analyticsConfListWithSupportingOfMotionRegionDetector* - a list of Analytics configurations
4. If *analyticsConfListWithSupportingOfMotionRegionDetector* is empty, FAIL the test and skip other steps.
5. ONVIF Client configure media profile with Analytics Configuration from *analyticsConfListWithSupportingOfMotionRegionDetector* list by following the procedure mentioned in Annex A.4 with the following input and output parameters
   - in *analyticsConfListWithSupportingOfMotionRegionDetector* - list of Analytics configurations.
   - out *profile* - media profile.
6. ONVIF Client retrieves Rule Options of tt:MotionRegionDetector type by following the procedure mentioned in Annex A.3 with the following input and output parameters
   - in **tt:MotionRegionDetector** - Rule type
   - in *profile*.Configurations.Analytics - Analytics Configuration
   - out *ruleOptions* - Rule Options
7. If *ruleOptionsList* does not contain RuleOption with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present), FAIL the test and skip other steps.
8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** (if @Type is present) does not contain **MotionRegionConfigOptions** element, FAIL the test and skip other steps.
9. Set *motionRegionConfigOptions* := RuleOption[0].MotionRegionConfigOptions, where RuleOption[0] is element with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** (if @Type is present).

10. ONVIF Client creates Motion Region Detector Rule by following the procedure mentioned in Annex A.10 with the following input parameter
    - in *profile* - media profile.
    - in *motionRegionConfigOptions* - motion region configuration option.
11. ONVIF Client invokes **GetEventProperties**.
12. The DUT responds with **GetEventPropertiesResponse** with parameters
    - TopicNamespaceLocation list
    - FixedTopicSet
    - TopicSet =: *topicSet*
    - TopicExpressionDialect list
    - MessageContentFilterDialect list
    - MessageContentSchemaLocation list
13. If *topicSet* does not contain **tns1:RuleEngine/MotionRegionDetector/Motion** topic, FAIL the test and skip other steps.
14. Set *topic* := tns1:RuleEngine/MotionRegionDetector/Motion topic from *topicSet*.
15. If *topic*.MessageDescription.IsProperty is not equal to true, FAIL the test and skip other steps.
16. If *topic* does not contain MessageDescription.Source.SimpleItemDescription item with Name = "VideoSource", FAIL the test and skip other steps.
17. If *topic*.MessageDescription.Source.SimpleItemDescription with Name = "VideoSource" does not have Type = "tt:ReferenceToken", FAIL the test and skip other steps.
18. If *motionRegionConfigOptions*.MotionRegionConfigOptions.RuleNotification = true:
    18.1. If *topic* does not contain MessageDescription.Source.SimpleItemDescription item with Name = "RuleName", FAIL the test and skip other steps.
    18.2. If *topic*.MessageDescription.Source.SimpleItemDescription with Name = "RuleName" does not have Type = "xs:string", FAIL the test and skip other steps.
19. If *topic* does not contain MessageDescription.Data.SimpleItemDescription item with Name = "State", FAIL the test and skip other steps.

20. If *topic*.MessageDescription.Data.SimpleItemDescription with Name = "State" does not have Type = "xs:boolean", FAIL the test and skip other steps.

21. If DUT supports Pull-Point Notification feature

    21.1. ONVIF Client creates PullPoint subscription for the specified topic by following the procedure mentioned in Annex A.6 with the following input and output parameters

    - in **"tns1:RuleEngine/MotionRegionDetector/Motion"** - Notification Topic
    - out *s* - Subscription reference
    - out *currentTime* - current time for the DUT
    - out *terminationTime* - Subscription termination time

    21.2. Until *timeout1* timeout expires, repeat the following steps:

    21.2.1 ONVIF Client waits for time *t* := min{(*tt*-*ct*)/2, 1 second}.

    21.2.2 ONVIF Client invokes **PullMessages** to the subscription endpoint *s* with parameters

    - Timeout := PT60S
    - MessageLimit := 1

    21.2.3 The DUT responds with **PullMessagesResponse** message with parameters

    - CurrentTime =: *ct*
    - TerminationTime =: *tt*
    - NotificationMessage list =: *notificationMessageList*

    21.2.4 If *notificationMessageList* contains more than one notification, FAIL the test and skip other steps.

    21.2.5 If *notificationMessageList* is not empty and *notificationMessageList*[0].Topic is not equal to **"tns1:RuleEngine/MotionRegionDetector/Motion"**, FAIL the test and skip other steps.

    21.2.6 If *notificationMessageList* is not empty and *notificationMessageList*[0].PropertyOperation = "Initialized" and *notificationMessageList*[0] has Source.SimpleItem with Name = "VideoSource" and with Value = *profile*.Configurations.VideoSource.SourceToken:

21.2.6.1 If *motionRegionConfigOptions*.MotionRegionConfigOptions.RuleNotification is not equal to true, go to step 21.3 [40].

21.2.6.2 If *notificationMessageList*[0] has Source.SimpleItem with Name = "RuleName" and with Value = "TestMotionRegion", go to step 21.3 [40].

21.2.7 If *timeout1* timeout expires for step 21.2 without Notification corresponds to step 21.2.6 [39], FAIL the test and skip other steps.

21.3. If *notificationMessageList*[0] does not have Data.SimpleItem with Name = "State" and with Value with type = "xs:boolean", FAIL the test and skip other steps.

22. ONVIF Client invokes **DeleteRules** request with parameters
    - ConfigurationToken := *profile*.Configurations.Analytics.@token
    - RuleName := TestMotionRegion
23. The DUT responds with **DeleteRulesResponse**.
24. ONVIF Client restores rule if it was deleted at step 10 [38].
25. ONVIF Client restores media profile if it was changed at step 5 [37].
26. If subscription was created at step 21.1, ONVIF Client deletes PullPoint subscription by following the procedure mentioned in Annex A.7 with the following input and output parameters
    - in *s* - Subscription reference

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **CreateRulesResponse** message.
- DUT did not send **DeleteRules** message.
- DUT did not send **GetEventPropertiesResponse** message.
- DUT did not send **PullMessagesResponse** message.

## 5.3 Capabilities

### 5.3.1 GET SERVICES AND GET ANALYTICS SERVICES CAPABILITIES CONSISTENCY

**Test Case ID:** ANALYTICS-3-1-1

**Specification Coverage:** Capability exchange (ONVIF Core Specification), Capabilities (ONVIF Analytics Service Spec)

**Feature under test:** GetServices, GetServiceCapabilities (Analytics)

**WSDL Reference:** devicemgmt.wsdl, analytics.wsdl

**Test Purpose:** To verify getting Analytics Service using GetServices request. To verify Get Services and Analytics Service Capabilities consistency.

**Pre-Requisite:** Analytics Service was received from the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client invokes **GetServices** message with parameters:
   - IncludeCapability := false
4. The DUT responds with a **GetServicesResponse** message with parameters:
   - Service list =: *listOfServicesWithoutCapabilities*
5. If *listOfServicesWithoutCapabilities* does not contain item with Namespace = "http://www.onvif.org/ver20/analytics/wsdl", FAIL the test and skip other steps.
6. Set *analyticsServ* := item from *listOfServicesWithoutCapabilities* list with Namespace = "http://www.onvif.org/ver20/analytics/wsdl".
7. If *analyticsServ*.Capabilities is specified, FAIL the test and skip other steps.
8. ONVIF Client invokes **GetServices** message with parameters:

- IncludeCapability := true

9. The DUT responds with a **GetServicesResponse** message with parameters:
   - Service list =: *listOfServicesWithCapabilities*
10. If *listOfServicesWithCapabilities* does not contain item with Namespace = "http://www.onvif.org/ver20/analytics/wsdl", FAIL the test and skip other steps.
11. Set *analyticsServ* := item from *listOfServicesWithCapabilities* list with Namespace = "http://www.onvif.org/ver20/analytics/wsdl".
12. If *analyticsServ*.Capabilities is not specified, FAIL the test and skip other steps.
13. If *analyticsServ*.Capabilities does not contain valid Capabilities element for Analytics service from "http://www.onvif.org/ver20/analytics/wsdl" namespace, FAIL the test and skip other steps.
14. ONVIF Client invokes **GetServiceCapabilities** (Analytics) request.
15. The DUT responds with **GetServiceCapabilitiesResponse** message with parameters
    - Capabilities =: *cap*
16. If *cap* differs from *analyticsServ*.Capabilities.Capabilities (see Note at the end of the test), FAIL the test.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetServicesResponse** messages.
- The DUT did not send **GetServiceCapabilitiesResponse** message.

**Note:** The following fields are compared at step 16:

- RuleSupport
- AnalyticsModuleSupport
- RuleOptionsSupported

- AnalyticsModuleOptionsSupported
- SupportedMetadata

## 5.3.2 ANALYTICS SERVICE CAPABILITIES

**Test Case ID:** ANALYTICS-3-1-2

**Specification Coverage:** Capabilities (ONVIF Analytics Service Spec)

**Feature under test:** GetServiceCapabilities (Analytics Service)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Analytics Service Capabilities.

**Pre-Requisite:** Analytics Service was received from the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client invokes **GetServiceCapabilities** request.
4. The DUT responds with **GetServiceCapabilitiesResponse** message with parameters
   - Capabilities =: *cap*
5. If *cap*.SupportedMetadata = true and *cap*.AnalyticsModuleSupport = false or skipped, FAIL the test.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetServicesResponse** messages.
- The DUT did not send **GetServiceCapabilitiesResponse** message.

## 5.4 Analytics Modules

### 5.4.1 GET SUPPORTED ANALYTICS MODULES

**Test Case ID:** ANALYTICS-4-1-1

**Specification Coverage:** GetSupportedAnalyticsModules (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedAnalyticsModules (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify getting supported analytics modules using GetSupportedAnalyticsModules request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
4. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   4.1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token
   4.2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
      - SupportedAnalyticsModules =: *supportedModules*
   4.3. For each Analytics Module Description *analyticsModuleDescription* in *supportedModules*.AnalyticsModuleDescription list repeat the following steps:

4.3.1. If *analyticsModuleDescription* does not have maxInstances attribute, FAIL the test, restore the DUT state, and skip other steps.

4.3.2. If at least one item in *analyticsModuleDescription*.Parameters list (SimpleItemDescription or ElementItemDescription item) has the same Name value with other item from the same list, FAIL the test, restore the DUT state, and skip other steps.

4.3.3. If at least one item in *analyticsModuleDescription*.Messages list (Source, or Key, or Data; SimpleItemDescription or ElementItemDescription item) has the same Name value with other item from the same list, FAIL the test, restore the DUT state, and skip other steps.

4.3.4. If *analyticsModuleDescription*.ParentTopic is not valid topic (see Annex A.11), FAIL the test, restore the DUT state, and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetSupportedAnalyticsModulesResponse** messages.

## 5.4.2 GET ANALYTICS MODULES OPTIONS

**Test Case ID:** ANALYTICS-4-1-2

**Specification Coverage:** GetAnalyticsModuleOptions (ONVIF Analytics Service Spec)

**Feature under test:** GetAnalyticsModuleOptions (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify getting supported analytics module options using GetAnalyticsModuleOptions request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT. Analytics Module Options is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
4. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   4.1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token
   4.2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
      - SupportedAnalyticsModules =: *supportedModules*
   4.3. ONVIF Client invokes **GetAnalyticsModuleOptions** request with parameters
      - Type is skipped
      - ConfigurationToken := *analyticsConf*.@token
   4.4. DUT responds with **GetAnalyticsModuleOptionsResponse** message with parameters
      - Options list =: *analyticsModuleOptionsFullList*
   4.5. If at least one item in *analyticsModuleOptionsFullList* list contains RuleType, FAIL the test, restore the DUT state, and skip other steps.
   4.6. For each Analytics Module Description *analyticsModuleDescription* in *supportedModules*.AnalyticsModuleDescription list repeat the following steps:
      4.6.1. ONVIF Client invokes **GetAnalyticsModuleOptions** request with parameters
         - Type := *analyticsModuleDescription*.Name
         - ConfigurationToken := *analyticsConf*.@token
      4.6.2. DUT responds with **GetAnalyticsModuleOptionsResponse** message with parameters
         - Options list =: *analyticsModuleOptionsList*

4.6.3. If at least one item in *analyticsModuleOptionsList* list contains RuleType, FAIL the test, restore the DUT state, and skip other steps.

4.6.4. If at least one item in *analyticsModuleOptionsList* list contains AnalyticsModule which is not equal to *analyticsModuleDescription*.Name, FAIL the test, restore the DUT state, and skip other steps.

4.6.5. If *analyticsModuleOptionsFullList* list does not contain all items from *analyticsModuleOptionsList* list (AnalyticsModule and Name to be used as unique identifier), FAIL the test, restore the DUT state, and skip other steps.

4.6.6. For each Parameters Description item *parametersDescriptionItem* in *analyticsModuleDescription*.Parameters list (SimpleItemDescription or ElementItemDescription items) list repeat the following steps:

4.6.6.1. If *analyticsModuleOptionsList* list does not contains item with Name = *parametersDescriptionItem*.Name, FAIL the test, restore the DUT state, and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetSupportedAnalyticsModulesResponse** messages.
- The DUT did not send **GetAnalyticsModuleOptionsResponse** messages.

## 5.4.3 GET ANALYTICS MODULES

**Test Case ID:** ANALYTICS-4-1-3

**Specification Coverage:** GetAnalyticsModules (ONVIF Analytics Service Spec)

**Feature under test:** GetAnalyticsModules (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify getting supported analytics modules using GetAnalyticsModules request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
4. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   4.1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token

   4.2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
      - SupportedAnalyticsModules =: *supportedModules*

   4.3. ONVIF Client invokes **GetAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token

   4.4. DUT responds with **GetAnalyticsModulesResponse** message with parameters
      - AnalyticsModule list =: *analyticsModuleList*

   4.5. If at least one item in *analyticsModuleList* list contains Type which in not equal to Name fileld of at least one item at *supportedModules*.AnalyticsModuleDescription list, FAIL the test, restore the DUT state, and skip other steps.

   4.6. For each Analytics Module Description *analyticsModuleDescription* in *supportedModules*.AnalyticsModuleDescription list repeat the following steps:
      4.6.1. If *analyticsModuleDescription*.fixed = true:
         4.6.1.1. If *analyticsModuleList* does not contain item with Type = *analyticsModuleDescription*.Name, FAIL the test, restore the DUT state, and skip other steps.
      4.6.2. If *analyticsModuleList* contains item with Type = *analyticsModuleDescription*.Name:

4.6.2.1. Set *analyticsModule* := *analyticsModuleList*[Type = *analyticsModuleDescription*.Name].

4.6.2.2. If *analyticsModule*.Parameters.SimpleItem contains at least one SimpleItem which does not have item with the same Name in *analyticsModuleDescription*.Parameters.SimpleItemDescription list, FAIL the test, restore the DUT state, and skip other steps.

4.6.2.3. If *analyticsModule*.Parameters.ElementItem contains at least one ElementItem which does not have item with the same Name in *analyticsModuleDescription*.Parameters.ElementItemDescription list, FAIL the test, restore the DUT state, and skip other steps.

4.6.2.4. If *analyticsModuleDescription*.Parameters.SimpleItemDescription contains at least one SimpleItemDescription which does not have item with the same Name in *analyticsModule*.Parameters.SimpleItem list, FAIL the test, restore the DUT state, and skip other steps.

4.6.2.5. If *analyticsModuleDescription*.Parameters.ElementItemDescription contains at least one ElementItemDescription which does not have item with the same Name in *analyticsModule*.Parameters.ElementItem list, FAIL the test, restore the DUT state, and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetSupportedAnalyticsModulesResponse** messages.
- The DUT did not send **GetAnalyticsModulesResponse** messages.

## 5.4.4 GET SUPPORTED METADATA

**Test Case ID:** ANALYTICS-4-1-4

**Specification Coverage:** GetSupportedMetadata (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify getting supported metadata using GetSupportedMetadata request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT. Supported Metadata feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves full list of supported Analytics Modules by following the procedure mentioned in Annex A.13 with the following input and output parameters
   - out *fullAnalyticsModuleDescriptionList* - a list of supported Analytics Module Description
4. Set *analyticsModuleTypeList* := list of @Name values from *fullAnalyticsModuleDescriptionList*
5. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList1* - Analytics Module List with Metadata Info
6. If *analyticsModuleList1* contains at least two elements with the same @Type, FAIL the test and skip other steps.
7. For each Analytics Module *analyticsModule* from *analyticsModuleList1* repeat the following steps:
   7.1. If *analyticsModule*.@Type is not equal to at least one Type from *analyticsModuleTypeList*, FAIL the test and skip other steps.
   7.2. ONVIF Client checks that object bounding boxes and shapes are located in the top left quarter of the image by following the procedure mentioned in Annex A.25 with the following input and output parameters
      - in *analyticsModule*.SampleFrame - sample frame of analytics module
8. For each Analytics Module Type *analyticsModuleType* from *analyticsModuleTypeList* repeat the following steps:

8.1. ONVIF Client invokes **GetSupportedMetadata** request with parameters

- Type := *analyticsModuleType*

8.2. DUT responds with **GetSupportedMetadataResponse** message with parameters

- AnalyticsModule list =: *analyticsModuleList2*

8.3. If *analyticsModuleList2* contains more than one element, FAIL the test and skip other steps.

8.4. If *analyticsModuleList2*[0].@Type is not equal to *analyticsModuleType*, FAIL the test and skip other steps.

8.5. If set of fields in *analyticsModuleList2*[0] is not equal to set of filels in corresponding AnalyticsModule from *analyticsModuleList1* (see Note at the end of the test), FAIL the test and skip other steps.

8.6. ONVIF Client checks that object bounding boxes and shapes are located in the top left quarter of the image by following the procedure mentioned in Annex A.25 with the following input and output parameters

- in *analyticsModuleList2*[0].SampleFrame - sample frame of analytics module

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **GetSupportedMetadataResponse** messages.

**Note:** Presence of all fields without their values are compared at step 8.5, @Type value is used as key.

## 5.4.5 CREATE ANALYTICS MODULES

**Test Case ID:** ANALYTICS-4-1-5

**Specification Coverage:** CreateAnalyticsModules (ONVIF Analytics Service Spec)

**Feature under test:** CreateAnalyticsModules (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify creating of analytics module using CreateAnalyticsModules request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT. Profile M is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client configures device for adding of new analytics module by following the procedure mentioned in Annex A.23 with the following input and output parameters
   - out *nonFixedModuleSupported* - if non fixed Analytics Module is supported
   - out (optional) *analyticsToken* - a token of Analytics Configuration
   - out (optional) *analyticsModuleDescription* - analytics module description
   - out *moduleToRestore* (optional) - analytics module to restore
4. If *nonFixedModuleSupported* = false, skip other steps with PASS result.
5. Set *moduleName* := generated random string.
6. ONVIF Client invokes **CreateAnalyticsModules** request with parameters
   - ConfigurationToken := *profile*.Configurations.Analytics.token
   - AnalyticsModule[0].@Name := *moduleName*
   - AnalyticsModule[0].@Type := *analyticsModuleDescription*.@Name
   - AnalyticsModule[0].Parameters := empty Parameters element
7. DUT responds with **CreateAnalyticsModulesResponse** message
8. ONVIF Client retrieves a set of analytics modules assigned of Analytics Configuration by following the procedure mentioned in Annex A.20 with the following input and output parameters
   - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
   - out *analyticsModuleList* - analytics module list

9. If *analyticsModuleList* does not contain AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName*, FAIL the test.
10. Set *createdAnalyticsModule1* := AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName* from *analyticsModuleList*.
11. For each SimpleItem element *simpleItem* in *createdAnalyticsModule1*.Parameters repeat the following steps:
    11.1. If *supportedAnalyticsModules*.AnalyticsModuleDescription[0].Parameters does not contain at least one SimpleItemDescription with @Name = *simpleItem*.@Name, FAIL the test and skip other steps.
12. For each ElementItem element *elementItem* in *createdAnalyticsModule1*.Parameters repeat the following steps:
    12.1. If *supportedAnalyticsModules*.AnalyticsModuleDescription[0].Parameters does not contain at least one ElementItemDescription with @Name = *elementItem*.@Name, FAIL the test and skip other steps.
13. ONVIF Client retrieves an Analytics Configuration by following the procedure mentioned in Annex A.21 with the following input and output parameters
    - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
    - out *analyticsConf* - analytics configuration
14. If *analyticsConf*[0].@token != *profile*.Configurations.Analytics.token, FAIL the test.
15. If *analyticsConf*[0].AnalyticsEngineConfiguration does not contain AnalyticsModule element with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName*, FAIL the test.
16. Set *createdAnalyticsModule2* := AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName* from *analyticsConf*[0].AnalyticsEngineConfiguration.
17. If list of SimpleItem.@Name in *createdAnalyticsModule2* does not equal to list of SimpleItem.@Name in *createdAnalyticsModule1*, FAIL the test.
18. For each SimpleItem element *simpleItem* in *createdAnalyticsModule2*.Parameters repeat the following steps:
    18.1. If *simpleItem*.@Value != @Value of corresponding SimpleItem in *createdAnalyticsModule1* (@Name will be used as key), FAIL the test.

19. If list of ElementItem.@Name in *createdAnalyticsModule2* does not equal to list of ElementItem.@Name in *createdAnalyticsModule1*, FAIL the test.
20. ONVIF Client deletes created analytics module to restore the DUT by following the procedure mentioned in Annex A.19 with the following input and output parameters
    - in *profile*.Configurations.Analytics.token - token of Analytics configuration
    - in *moduleName*.@Name - Name of the analytics module to be deleted
21. ONVIF Client retores *moduleToRestore*.
22. ONVIF Client restores media profile if it was changed at step 3.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **CreateAnalyticsModulesResponse** messages.

## 5.4.6 DELETE ANALYTICS MODULES

**Test Case ID:** ANALYTICS-4-1-6

**Specification Coverage:** DeleteAnalyticsModules (ONVIF Analytics Service Spec)

**Feature under test:** DeleteAnalyticsModules (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify delete of analytics module using DeleteAnalyticsModules request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT. Profile M is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.

3. ONVIF Client configures device for adding of new analytics module by following the procedure mentioned in Annex A.23 with the following input and output parameters
   - out *nonFixedModuleSupported* - if non fixed Analytics Module is supported
   - out (optional) *analyticsToken* - a token of Analytics Configuration
   - out (optional) *analyticsModuleDescription* - analytics module description
   - out *moduleToRestore* (optional) - analytics module to restore
4. If *nonFixedModuleSupported* = false, skip other steps with PASS result.
5. Set *moduleName* := generated random string.
6. ONVIF Client creates new analytics module by following the procedure mentioned in Annex A.22 with the following input and output parameters
   - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
   - in *moduleName* - analytics module name
   - in *analyticsModuleDescription*.@Name - analytics module type
7. ONVIF Client invokes **DeleteAnalyticsModules** request with parameters
   - ConfigurationToken := *profile*.Configurations.Analytics.token
   - AnalyticsModule[0].@Name := *moduleName*
8. DUT responds with **DeleteAnalyticsModulesResponse** message
9. ONVIF Client retrieves a set of analytics modules assigned of Analytics Configuration by following the procedure mentioned in Annex A.20 with the following input and output parameters
   - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
   - out *analyticsModuleList* - analytics module list
10. If *analyticsModuleList* contains AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName*, FAIL the test.
11. ONVIF Client retrieves an Analytics Configuration by following the procedure mentioned in Annex A.21 with the following input and output parameters
    - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration

- out *analyticsConf* - analytics configuration

12. If *analyticsConf*[0].@token != *profile*.Configurations.Analytics.token, FAIL the test.
13. If *analyticsConf*[0].AnalyticsEngineConfiguration contains AnalyticsModule element with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName*, FAIL the test.
14. ONVIF Client retores *moduleToRestore*.
15. ONVIF Client restores media profile if it was changed at step 3.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **DeleteAnalyticsModulesResponse** messages.

## 5.4.7 MODIFY ANALYTICS MODULES

**Test Case ID:** ANALYTICS-4-1-7

**Specification Coverage:** ModifyAnalyticsModules (ONVIF Analytics Service Spec)

**Feature under test:** ModifyAnalyticsModules (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify modify of analytics module using ModifyAnalyticsModules request.

**Pre-Requisite:** Analytics Service was received from the DUT. Media2 Service was received from the DUT. Analytics Modules is supported by the DUT. Analytics Module Options is supported by the DUT. Profile M is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.

3. ONVIF Client selects existing analytics module to modify:

   3.1. ONVIF Client selects existing analytics module by following the procedure mentioned in Annex A.24 with the following input and output parameters

   - out (optional) *analyticsToken* - a token of Analytics Configuration
   - out (optional) *analyticsModule1* - analytics module

   3.2. If *analyticsModule1* was returned at step 3.1:

      3.2.1. ONVIF Client retrieves a list of supported analytics modules by following the procedure mentioned in Annex A.17 with the following input and output parameters

      - in *analyticsToken* - a token of Analytics Configuration
      - out *supportedAnalyticsModules* - supported analytics modules.

      3.2.2. If *supportedAnalyticsModules*.AnalyticsModuleDescription list does not contain AnalyticsModuleDescription item with @Name = *analyticsModule1*.@Type, FAIL the test and skip other steps.

      3.2.3. Set *analyticsModuleDescription* := AnalyticsModuleDescription item from *supportedAnalyticsModules* with @Name = *analyticsModule1*.@Type.

      3.2.4. Go to step 5.

4. ONVIF Client creates new analytics module:

   4.1. ONVIF Client configures device for adding of new analytics module by following the procedure mentioned in Annex A.23 with the following input and output parameters

   - out *nonFixedModuleSupported* - if non fixed Analytics Module is supported
   - out (optional) *analyticsToken* - a token of Analytics Configuration
   - out (optional) *analyticsModuleDescription* - analytics module description
   - out *moduleToRestore* (optional) - analytics module to restore

   4.2. If *nonFixedModuleSupported* = false, FAIL the test and skip other steps.

   4.3. Set *moduleName* := generated random string.

   4.4. ONVIF Client creates new analytics module by following the procedure mentioned in Annex A.22 with the following input and output parameters

- in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
- in *moduleName* - analytics module name
- in *analyticsModuleDescription*.@Name - analytics module type

4.5. ONVIF Client retrieves a set of analytics modules assigned of Analytics Configuration by following the procedure mentioned in Annex A.20 with the following input and output parameters

- in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
- out *analyticsModuleList* - analytics module list

4.6. If *analyticsModuleList* does not contain AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName*, FAIL the test.

4.7. Set *analyticsModule1* := AnalyticsModule with @Type = *analyticsModuleDescription*.@Name and with @Name = *moduleName* from *analyticsModuleList*.

5. ONVIF Client invokes **ModifyAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsToken*
   - AnalyticsModule[0].@Name := *analyticsModule1*.@Name
   - AnalyticsModule[0].@Type := *analyticsModule1*.@Type
   - AnalyticsModule[0].Parameters := empty Parameters element
6. DUT responds with **ModifyAnalyticsModulesResponse** message
7. ONVIF Client retrieves a set of analytics modules assigned of Analytics Configuration by following the procedure mentioned in Annex A.20 with the following input and output parameters
   - in *analyticsToken* - a token of Analytics Configuration
   - out *analyticsModuleList* - analytics module list
8. If *analyticsModuleList* does not contain AnalyticsModule with @Type = *analyticsModule1*.@Type and with @Name = *analyticsModule1*.@Name, FAIL the test.
9. Set *modifiedAnalyticsModule1* := AnalyticsModule with @Type = *analyticsModule1*.@Type and with @Name = *analyticsModule1*.@Name from *analyticsModuleList*.

10. For each SimpleItem element *simpleItem* in *modifiedAnalyticsModule1*.Parameters repeat the following steps:

    10.1. If *AnalyticsModuleDescription*.Parameters does not contain at least one SimpleItemDescription with @Name = *simpleItem*.@Name, FAIL the test and skip other steps.

11. For each ElementItem element *elementItem* in *modifiedAnalyticsModule1*.Parameters repeat the following steps:

    11.1. If *AnalyticsModuleDescription*.Parameters does not contain at least one ElementItemDescription with @Name = *elementItem*.@Name, FAIL the test and skip other steps.

12. ONVIF Client retrieves an Analytics Configuration by following the procedure mentioned in Annex A.21 with the following input and output parameters

    - in *analyticsToken* - a token of Analytics Configuration
    - out *analyticsConf* - analytics configuration

13. If *analyticsConf*[0].@token != *analyticsToken*, FAIL the test.

14. If *analyticsConf*[0].AnalyticsEngineConfiguration does not contain AnalyticsModule element with @Type = *analyticsModule1*.@Type and with @Name = *analyticsModule1*.@Name, FAIL the test.

15. Set *modifiedAnalyticsModule2* := AnalyticsModule with @Type = *analyticsModule1*.@Type and with @Name = *analyticsModule1*.@Name from *analyticsConf*[0].AnalyticsEngineConfiguration.

16. If list of SimpleItem.@Name in *modifiedAnalyticsModule2* does not equal to list of SimpleItem.@Name in *modifiedAnalyticsModule1*, FAIL the test.

17. For each SimpleItem element *simpleItem* in *modifiedAnalyticsModule2*.Parameters repeat the following steps:

    17.1. If *simpleItem*.@Value != @Value of corresponding SimpleItem in *modifiedAnalyticsModule1* (@Name will be used as key), FAIL the test.

18. If list of ElementItem.@Name in *modifiedAnalyticsModule2* does not equal to list of ElementItem.@Name in *modifiedAnalyticsModule1*, FAIL the test.

19. ONVIF Client deletes analytics module created at step 4.4 if any to restore the DUT by following the procedure mentioned in Annex A.19 with the following input and output parameters

- in *profile*.Configurations.Analytics.token - token of Analytics configuration
- in *moduleName*.@Name - Name of the analytics module to be deleted

20. ONVIF Client retores *moduleToRestore* if any.
21. ONVIF Client restores media profile if it was changed at step 4.1.
22. ONVIF Client restores analytics module if it was selected at step 3.1.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- The DUT did not send **ModifyAnalyticsModulesResponse** messages.

## 5.5 Scene Elements

### 5.5.1 OBJECT CLASSIFICATION METADATA

**Test Case ID:** ANALYTICS-5-1-1

**Specification Coverage:** Object Class descriptor (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Object Class descriptor.

**Pre-Requisite:** Analytics Service was received from the DUT. Object Classification feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters

- out *analyticsModuleList* - Analytics Module List with Metadata Info

4. For each Object *object* from *analyticsModule*.SampleFrame.Object list repeat the following steps:

   4.1. If *object* contains Appearance.Class

      4.1.1. Set *likelihoodSum* := {sum of all Type.@Likelihood}

      4.1.2. If *likelihoodSum* > 1, log WARNING message, and PASS the test.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

**Note:** At step 4.1.1 if Appearance.Class.Type element does not contain @Likelihood, the ONVIF Client assumes it as 1.

## 5.5.2 VEHICLE INFORMATION DESCRIPTOR

**Test Case ID:** ANALYTICS-5-1-2

**Specification Coverage:** Vehicle information descriptor (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Vehicle information descriptor.

**Pre-Requisite:** Analytics Service was received from the DUT. Vehicle Info feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.

3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info
4. If *analyticsModuleList* does not contain at least one AnalyticsModule that contains SampleFrame.Object.Appearance with VehicleInfo element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## 5.5.3 GEO LOCATION METADATA

**Test Case ID:** ANALYTICS-5-1-3

**Specification Coverage:** GeoLocation metadata (ONVIF Profile M Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify GeoLocation metadata.

**Pre-Requisite:** Analytics Service was received from the DUT. Geo Location feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info

4. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object. Appearance.GeoLocation element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## 5.5.4 HUMAN FACE DESCRIPTOR

**Test Case ID:** ANALYTICS-5-1-4

**Specification Coverage:** Face descriptor (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Human Face descriptor.

**Pre-Requisite:** Analytics Service was received from the DUT. Human Face feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info
4. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object.Appearance with HumanFace element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## 5.5.5 LICENSE PLATE INFORMATION DESCRIPTOR

**Test Case ID:** ANALYTICS-5-1-5

**Specification Coverage:** License plate information descriptor (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify License Plate Information descriptor.

**Pre-Requisite:** Analytics Service was received from the DUT. License Plate Info feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info
4. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object.Appearance with LicensePlateInfo element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## 5.5.6 HUMAN BODY DESCRIPTOR

**Test Case ID:** ANALYTICS-5-1-6

**Specification Coverage:** Human body descriptor (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Human Body descriptor.

**Pre-Requisite:** Analytics Service was received from the DUT. Human Body feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info
4. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object.Appearance with HumanBody element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## 5.5.7 IMAGE DATA

**Test Case ID:** ANALYTICS-5-1-7

**Specification Coverage:** Image Data (ONVIF Analytics Service Spec)

**Feature under test:** GetSupportedMetadata (Analytics)

**WSDL Reference:** analytics.wsdl

**Test Purpose:** To verify Image Data metadata.

**Pre-Requisite:** Analytics Service was received from the DUT. Image Sending feature is supported by the DUT.

**Test Configuration:** ONVIF Client and DUT

**Test Procedure:**

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client retrieves a list of supported metadata by following the procedure mentioned in Annex A.14 with the following input and output parameters
   - out *analyticsModuleList* - Analytics Module List with Metadata Info
4. If the DUT supports Local Storage Image Sending Type feature or Remote Storage Image Sending Type feature:
   4.1. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object. Appearance.ImageRef element, FAIL the test and skip other steps.
5. If the DUT supports Embedded Image Sending Type feature:
   5.1. If *analyticsModuleList* does not contain at least one AnalyticsModule with SampleFrame.Object. Appearance.Image element, FAIL the test and skip other steps.

**Test Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

# Annex A Helper Procedures and Additional Notes

## A.1 Get Analytics Configurations List

**Name:** HelperGetAnalyticsConfigurationsList

**Procedure Purpose:** Helper procedure to retrieve Analytics Configurations List.

**Pre-requisite:** Media2 Service is received from the DUT.

**Input:** None.

**Returns:** Analytics Configurations list (*analyticsConfList*).

**Procedure:**

1. ONVIF Client invokes **GetAnalyticsConfigurations** request with parameters
   - ConfigurationToken skipped
   - ProfileToken skipped
2. The DUT responds with **GetAnalyticsConfigurationsResponse** with parameters
   - Configurations list =: *analyticsConfList*
3. If *analyticsConfList* is empty, FAIL the test.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetAnalyticsConfigurationsResponse** message.

## A.2 Get List of Analytics Configurations With Supporting of Required Rule Type

**Name:** HelperGetAnalyticsConfigurationSupportsRequiredRuleTypeList

**Procedure Purpose:** Helper procedure to retrieve full list of Analytics Configuration that supports required rule type.

**Pre-requisite:** Analytics Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Rule Type (*ruleType*).

**Returns:** List of Analytics Configuration that supports rule with type equals to *ruleType* (*analyticsConfSupportsRuleTypeList*).

**Procedure:**

1. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
2. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   2.1. ONVIF Client invokes **GetSupportedRules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token
   2.2. DUT responds with **GetSupportedRulesResponse** message with parameters
      - SupportedRules =: *supportedRules*
   2.3. If *supportedRules* contains RuleDescription element with Name value is equal to *ruleType*, set *analyticsConfSupportsRuleTypeList* := *analyticsConfSupportsRuleTypeList* + *analyticsConf*.@token

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedRulesResponse** message.

## A.3 Get Specific Rule Options

**Name:** HelperGetSpecificRuleOptions

**Procedure Purpose:** Helper procedure to retrieve options of required rule type.

**Pre-requisite:** Analytics Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Analytics Configuration (*analyticsConf*), Rule Type (*ruleType*).

**Returns:** Rule Options *ruleOptions* of *ruleType*.

**Procedure:**

1. ONVIF Client invokes **GetRuleOptions** request with parameters
   - RuleType := *ruleType*
   - ConfigurationToken := *analyticsConf*.@token
2. DUT responds with **GetRuleOptionsResponse** message with parameters
   - RuleOptions list =: *ruleOptionsList*
3. If **ruleOptionsList** contains more than one RuleOptions element, FAIL the test abd skip other steps.
4. If **ruleOptionsList** is empty, FAIL the test abd skip other steps.
5. Set *ruleOptions* := **ruleOptionsList**[0].

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetRuleOptionsResponse** message.

## A.4 Configure Media Profile with required Analytics Configuration

**Name:** HelperConfigureMediaProfileWithRequiredAnalytics

**Procedure Purpose:** Helper procedure to configure Media Profile to contain required Analytics Configuration.

**Pre-requisite:** Media2 Service is received from the DUT. Analytics is supported by the DUT.

**Input:** List of Analytics configurations *analyticsConfList*

**Returns:** Media Profile (*profile*) that contains Analytics Configuration from *analyticsConfList* and Video Source Configuration.

**Procedure:**

1. ONVIF Client invokes **GetProfiles** request with parameters
   - Token skipped
   - Type[0] := VideoSource
   - Type[1] := Analytics
2. The DUT responds with **GetProfilesResponse** message with parameters
   - Profiles list =: *profileList*
3. For each Media Profile *profile1* in *profileList* with both Configuration.VideoSource and Configuration.Analytics repeat the following steps:
   3.1. For each Analytics (*analytics*) in *analyticsConfList*:
      3.1.1. If *profile1*.Configuration.Analytics.@token value is equal to *analytics*.@token, set *profile* := *profile1* and skip other steps in procedure.
4. For each Media Profile *profile1* in *profileList* that contains VideoSource configuration repeat the following steps:
   4.1. ONVIF Client invokes **GetAnalyticsConfigurations** request with parameters
      - ConfigurationToken skipped
      - ProfileToken := *profile*.@token
   4.2. The DUT responds with **GetAnalyticsConfigurationsResponse** message with parameters
      - Configurations list =: *acList*
   4.3. If *acList* contains analytics (*analytics*) from *analyticsConfList* (comparing by analytics token):
      4.3.1. ONVIF Client invokes **AddConfiguration** request with parameters
         - ProfileToken := *profile1*.@token
         - Name skipped
         - Configuration[0].Type := Analytics
         - Configuration[0].Token := *analytics*.Configurations.@token

4.3.2. The DUT responds with **AddConfigurationResponse** message.

4.3.3. Set *profile* := *profile1* and skip other steps in procedure.

5. FAIL the test and skip other steps.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetProfilesResponse** message.
- DUT did not send **GetAnalyticsConfigurationsResponse** message.
- DUT did not send **AddConfigurationResponse** message.

## A.5 Get Rules

**Name:** HelperGetRules

**Procedure Purpose:** Helper procedure to retrieve Rules list for Analytics configuration.

**Pre-requisite:** Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Analytics configuration token (*analyticsToken*).

**Returns:** Rule list (*ruleList*).

**Procedure:**

1. ONVIF Client invokes **GetRules** request with parameters
   - ConfigurationToken := (*analyticsToken*)
2. The DUT responds with **GetRulesResponse** with parameters
   - Rule list =: *ruleList*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetRulesResponse** message.

## A.6 Create Pull Point Subscription

**Name:** HelperCreatePullPointSubscription

**Procedure Purpose:** Helper procedure to create PullPoint Subscription with specified Topic.

**Pre-requisite:** Event Service is received from the DUT.

**Input:** Notification Topic (*topic*).

**Returns:** Subscription reference (*s*), current time for the DUT (*ct*), subscription termination time (*tt*).

**Procedure:**

1. ONVIF Client invokes **CreatePullPointSubscription** request with parameters
   - Filter.TopicExpression := *topic*
   - Filter.TopicExpression.@Dialect := "http://www.onvif.org/ver10/tev/topicExpression/ConcreteSet"
2. The DUT responds with **CreatePullPointSubscriptionResponse** message with parameters
   - SubscriptionReference =: *s*
   - CurrentTime =: *ct*
   - TerminationTime =: *tt*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **CreatePullPointSubscriptionResponse** message.

## A.7 Delete Subscription

**Name:** HelperDeleteSubscription

**Procedure Purpose:** Helper procedure to delete supscribtion.

**Pre-requisite:** Event Service is received from the DUT.

**Input:** Subscription reference (*s*)

**Returns:** None

**Procedure:**

1. ONVIF Client sends an **Unsubscribe** to the subscription endpoint s.
2. The DUT responds with **UnsubscribeResponse** message.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **UnsubscribeResponse** message.

## A.8 Calculate Free Space for Rule

**Name:** Annex_HelperCalculateFreeSpaceForRule

**Procedure Purpose:** Helper procedure to calculate free space for additional rules with required Rule Type for requested Analytics Configuration.

**Pre-requisite:** Analytics Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Analytics Configuration token *analyticsConfigToken*. Required Rule Type *ruleType*.

**Returns:** Flag if maxInstances is supported (*maxInstances*). Amount of additional rules with requested type that may be added for requested Analytics Configuration (*amountOfAdditionalRules*) (optional, returned in case *maxInstances* = true).

**Procedure:**

1. ONVIF Client invokes **GetSupportedRules** request with parameters
   - ConfigurationToken := *analyticsConfigToken*
2. DUT responds with **GetSupportedRulesResponse** message with parameters

- SupportedRules =: *supportedRules*

3. If *supportedRules* does not contain RuleDescription element with Name value is equal to *ruleType*, FAIL the test and skip other steps.
4. Set *rule* := *supportedRules*.RuleDescription[0], where RuleDescription[0] is RuleDescription element with Name value is equal to *ruleType*.
5. If *rule* does not contain maxInstances attribute, set *maxInstances* := false, return it in test procedure and skip other annex steps.
6. Set *maxInstances* := true.
7. ONVIF Client invokes **GetRules** request with parameters
   - ConfigurationToken := *analyticsConfigToken*
8. DUT responds with **GetRulesResponse** message with parameters
   - Rule list =: *ruleList*
9. Set *amountOfExistingRules* := amount of Rules in *ruleList* with Type = *ruleType*.
10. Set *amountOfAdditionalRules* := *rule*.maxInstances - *amountOfExistingRules*.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedRulesResponse** message.
- DUT did not send **GetRulesResponse** message.

## A.9 Delete Rule with Requested Type

**Name:** HelperDeleteRuleWithRequestedType

**Procedure Purpose:** Helper procedure to delete existing Rule with requested type for specified Analytics Configuration.

**Pre-requisite:** Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Analytics configuration token (*analyticsToken*). Rule type to delete (*ruleType*).

**Returns:** None.

**Procedure:**

1. ONVIF Client invokes **GetRules** request with parameters
   - ConfigurationToken := *analyticsToken*
2. DUT responds with **GetRulesResponse** message with parameters
   - Rule list =: *ruleList*
3. Set *ruleToDelete* := *ruleList*[0], where *ruleList*[0] is the first Rule with Type = *ruleType*.
4. ONVIF Client invokes **DeleteRules** request with parameters
   - ConfigurationToken := (*analyticsToken*)
   - RuleName[0] := *ruleToDelete*.Name
5. The DUT responds with **DeleteRulesResponse**.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **DeleteRulesResponse** message.

## A.10 Create Motion Region Detector Rule

**Name:** HelperCreateMotionRegionDetectorRule

**Procedure Purpose:** Helper procedure to create Motion Region Detector Rule.

**Pre-requisite:** Media2 Service is received from the DUT. Rule Engine is supported by the Device as indicated by the RuleSupport capabilities.

**Input:** Media Profile (*profile*). Rule Options *ruleOptions*.

**Returns:** None.

**Procedure:**

1. ONVIF Client calculates free space for adding of new rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.8 with the following input and output parameters
   - in **tt:MotionRegionDetector** - rule type
   - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
   - out *maxInstances* - flag if maxInstances is supported.
   - out *amountOfAdditionalRules* - amount of additional rules.
2. If *amountOfAdditionalRules* > 0 or *maxInstances*=false, go to step 4 [76].
3. ONVIF Client deletes rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.9 with the following input and output parameters
   - in **tt:MotionRegionDetector** - rule type
   - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
4. ONVIF Client invokes **CreateRules** request with parameters
   - ConfigurationToken := *profile*.Configurations.Analytics.@token
   - Rule[0].@Name := TestMotionRegion
   - Rule[0].@Type := tt:MotionRegionDetector
   - Rule[0].Parameters.ElementItem[0].@Name := "MotionRegion"
   - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@x := *profile*.Configurations.VideoSource.Bounds.@x
   - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@y := *profile*.Configurations.VideoSource.Bounds.@y
   - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@x := *profile*.Configurations.VideoSource.Bounds.@x
   - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
   - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1

- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Armed := true if *motionRegionConfigOptions*.DisarmSupport = true, otherwise skipped.
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Sensitivity := 1

5. The DUT responds with **CreateRulesResponse** or SOAP fault response.
6. If DUT responded with SOAP fault response:
   6.1. If *maxInstances* = true, fail the test and skip other steps.
   6.2. ONVIF Client deletes rule with tt:MotionRegionDetector type by following the procedure mentioned in Annex A.9 with the following input and output parameters
      - in **tt:MotionRegionDetector** - rule type
      - in *profile*.Configurations.Analytics.token - a token of Analytics Configuration
   6.3. ONVIF Client invokes **CreateRules** request with parameters
      - ConfigurationToken := *profile*.Configurations.Analytics.@token
      - Rule[0].@Name := TestMotionRegion
      - Rule[0].@Type := tt:MotionRegionDetector
      - Rule[0].Parameters.ElementItem[0].@Name := "MotionRegion"
      - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@x := *profile*.Configurations.VideoSource.Bounds.@x
      - Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[0].@y := *profile*.Configurations.VideoSource.Bounds.@y

- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@x := *profile*.Configurations.VideoSource.Bounds.@x
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[1].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[2].@y := *profile*.Configurations.VideoSource.Bounds.@y
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@x := *profile*.Configurations.VideoSource.Bounds.@x + *profile*.Configurations.VideoSource.Bounds.@width - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.Polygon.Point[3].@y := *profile*.Configurations.VideoSource.Bounds.@y + *profile*.Configurations.VideoSource.Bounds.@height - 1
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Armed := true if *motionRegionConfigOptions*.DisarmSupport = true, otherwise skipped.
- Rule[0].Parameters.ElementItem[0].MotionRegion.@Sensitivity := 1

6.4. The DUT responds with **CreateRulesResponse**.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **DeleteRulesResponse** message.

## A.11 Topic Format Verification

**Name:** HelperTopicCheck

**Procedure Purpose:** Helper procedure to verifye topic format.

**Pre-requisite:** None.

**Input:** Topic to be verified (*topic*).

**Returns:** None.

**Procedure:**

1. If *topic* contains at least one whitespace, FAIL the test, restore the DUT state, and skip other steps.
2. If *topic* does not corrspond to the format defined in Annex A.12, FAIL the test, restore the DUT state, and skip other steps.
3. If *topic* contains at least one namespace prefix which namespace is not declared according to [XML Schema Part 2], section 3.2.18 QName, FAIL the test, restore the DUT state, and skip other steps.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT does not pass all assertions.

## A.12 Valid Topic Format

Topic shall correspond to the following format in Extended Backus Naur Form:

- TopicExpression ::= TopicPath
- TopicPath ::= RootTopic ChildTopicExpression*
- RootTopic ::= QName
- ChildTopicExpression ::= '/' ChildTopicName
- ChildTopicName ::= QName | NCName

## A.13 Get All Supported Analytics Modules

**Name:** GetAllSupportedAnalyticsModules

**Procedure Purpose:** Helper procedure to retrieve full list of Analytics Modules supported by a DUT.

**Pre-requisite:** Media2 Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** None.

**Returns:** Full Analytics Module Description List (*fullAnalyticsModuleDescriptionList*).

**Procedure:**

1. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
2. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   2.1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token
   2.2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
      - SupportedAnalyticsModules =: *supportedAnalyticsModules*
   2.3. Set *supportedAnalyticsModules*.AnalyticsModuleDescription list =: *analyticsModuleDescriptionList1*
   2.4. Set *fullAnalyticsModuleDescriptionList* := *fullAnalyticsModuleDescriptionList* + *analyticsModuleDescriptionList1*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetAnalyticsModulesResponse** message.

## A.14 Get Supported Metadata

**Name:** HelperGetSupportedMetadata

**Procedure Purpose:** Helper procedure to retrieve full list of metadata supported by a DUT.

**Pre-requisite:** Supported Metadata feature is supported by the DUT.

**Input:** None.

**Returns:** Analytics Module List with Metadata Info (*analyticsModuleList*).

**Procedure:**

1. ONVIF Client invokes **GetSupportedMetadata** request with parameters
   - Type skipped
2. DUT responds with **GetSupportedMetadataResponse** message with parameters
   - AnalyticsModule list =: *analyticsModuleList*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedMetadataResponse** message.

## A.15 Get Supported Metadata for Analytics Module Type

**Name:** HelperGetSupportedMetadataForAnalyticsModuleType

**Procedure Purpose:** Helper procedure to retrieve metadata supported by a requested Analytics Module Type.

**Pre-requisite:** Supported Metadata feature is supported by the DUT.

**Input:** Analytics Module Type (*analyticsModuleType*).

**Returns:** Analytics Module List with Metadata Info (*analyticsModuleList*).

**Procedure:**

1. ONVIF Client invokes **GetSupportedMetadata** request with parameters
   - Type := *analyticsModuleType*
2. DUT responds with **GetSupportedMetadataResponse** message with parameters
   - AnalyticsModule list =: *analyticsModuleList*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedMetadataResponse** message.

## A.16 Get List of Analytics Configurations With Supporting of Non Fixed Analytics Modules

**Name:** HelperGetAnalyticsConfigurationSupportsNonFixedAnalyticsModules

**Procedure Purpose:** Helper procedure to retrieve full list of Analytics Configuration that supports at least one non fixed Analytics Module.

**Pre-requisite:** Analytics Service is received from the DUT. Media2 Service is received from the DUT. Analytics Modules is supported by the DUT. Media2 Service .

**Input:** None.

**Returns:** List of Analytics Configuration that supports Analytics Modules (*analyticsConfListSupportsAnalyticsModules*).

**Procedure:**

1. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
2. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   2.1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
      - ConfigurationToken := *analyticsConf*.@token
   2.2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
      - SupportedAnalyticsModules =: *supportedModules*
   2.3. If *supportedModules*.AnalyticsModuleDescription list is not empty and has at least one AnalyticsModuleDescription with @fixed ! = true, set *analyticsConfListSupportsAnalyticsModules* := *analyticsConfListSupportsAnalyticsModules* + *analyticsConf*.@token

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedAnalyticsModulesResponse** message.

## A.17 Get Supported Analytics Modules

**Name:** HelperGetSupportedAnalyticsModules

**Procedure Purpose:** Helper procedure to retrieve a list of analytics modules that are supported by the given analytics configuration.

**Pre-requisite:** Analytics Modules is supported by the DUT.

**Input:** Analytics configuration token (*analyticsConfigToken*).

**Returns:** Supported Analytics Modules (*supportedAnalyticsModules*).

**Procedure:**

1. ONVIF Client invokes **GetSupportedAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsConfigToken*
2. DUT responds with **GetSupportedAnalyticsModulesResponse** message with parameters
   - SupportedAnalyticsModules =: *supportedAnalyticsModules*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetSupportedAnalyticsModules** message.

## A.18 Prepare Free Space for Analytics Module

**Name:** HelperFreeSpaceForModule

**Procedure Purpose:** Helper procedure to configure Analytics Configuration with free space for adding of Analytics Module with requested type.

**Pre-requisite:** Analytics Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** Analytics Configuration token *analyticsConfigToken*. Analytics module type (*analyticsModuleType*) for which free space is required. Maximum number of instances per configuration *maxInstances*.

**Returns:** Analytics module (optional) (*deletedModule*).

**Procedure:**

1. ONVIF Client invokes **GetAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsConfigToken*
2. DUT responds with **GetAnalyticsModulesResponse** message with parameters
   - AnalyticsModule list =: *analyticsModuleList*
3. Set *amountOfExistingModules* := amount of AnalyticsModule in *analyticsModuleList* with Type = *analyticsModuleType*.
4. If *amountOfExistingModules* = *maxInstances*
   4.1. Set *moduleToDelete* := the first analytics module from *analyticsModuleList* that has @Type = *analyticsModuleType*.
   4.2. ONVIF Client deletes one analytics module by following the procedure mentioned in Annex A.19 with the following input and output parameters
      - in *analyticsConfigToken* - token of Analytics configuration
      - in *moduleToDelete*.@Name - Name of the analytics module to be deleted
   4.3. Returns *moduleToDelete*.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetAnalyticsModulesResponse** message.

## A.19 Delete Analytics Module

**Name:** HelperDeleteAnalyticsModule

**Procedure Purpose:** Helper procedure to delete analytics module from specified Analytics Configuration.

**Pre-requisite:** Analytics Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** Analytics configuration token (*analyticsToken*). Name of the analytics module (*analyticsModuleName*).

**Returns:** None.

**Procedure:**

1. ONVIF Client invokes **DeleteAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsToken*
   - AnalyticsModuleName[0] := *analyticsModuleName*
2. The DUT responds with **DeleteAnalyticsModulesResponse**.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **DeleteAnalyticsModulesResponse** message.

## A.20 Get Analytics Modules

**Name:** HelperGetAnalyticsModules

**Procedure Purpose:** Helper procedure to retrieve currently assigned set of analytics modules of a Analytics Configuration.

**Pre-requisite:** Analytics Modules is supported by the DUT.

**Input:** Token of Analytics Configuration (*analyticsConfToken*).

**Returns:** Analytics Module List (*analyticsModuleList*).

**Procedure:**

1. ONVIF Client invokes **GetAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsConfToken*
2. DUT responds with **GetAnalyticsModulesResponse** message with parameters
   - AnalyticsModule list =: *analyticsModuleList*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetAnalyticsModulesResponse** message.

## A.21 Get Analytics Configuration

**Name:** HelperGetAnalyticsConfiguration

**Procedure Purpose:** Helper procedure to retrieve Analytics Configuration.

**Pre-requisite:** Media2 Service is received from the DUT.

**Input:** Token of Analytics Configuration (*analyticsConfToken*).

**Returns:** Analytics Configuration (*analyticsConf*).

**Procedure:**

1. ONVIF Client invokes **GetAnalyticsConfigurations** request with parameters
   - ConfigurationToken := *analyticsConfToken*
   - ProfileToken skipped
2. The DUT responds with **GetAnalyticsConfigurationsResponse** with parameters
   - Configurations list =: *analyticsConfList*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **GetAnalyticsConfigurationsResponse** message.

## A.22 Create Analytics Module

**Name:** HelperCreateAnalyticsModule

**Procedure Purpose:** Helper procedure to create analytics module from specified Analytics Configuration.

**Pre-requisite:** Analytics Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** Analytics configuration token (*analyticsToken*). Name of the analytics module (*analyticsModuleName*). Type of the analytics module (*analyticsModuleType*).

**Returns:** None.

**Procedure:**

1. ONVIF Client invokes **CreateAnalyticsModules** request with parameters
   - ConfigurationToken := *analyticsToken*
   - AnalyticsModule[0].@Name := *analyticsModuleName*
   - AnalyticsModule[0].@Type := *analyticsModuleType*
   - AnalyticsModule[0].Parameters := empty Parameters element
2. DUT responds with **CreateAnalyticsModulesResponse** message

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- DUT did not send **CreateAnalyticsModulesResponse** message.

## A.23 Device Configuration For Create Analytics Module

**Name:** HelperDeviceConfigurationForCreateAnalyticsModule

**Procedure Purpose:** Helper procedure for device configuration for adding of analytics module.

**Pre-requisite:** Analytics Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** None.

**Returns:** If non fixed Analytics Module is supported (*nonFixedModuleSupported*). Analytics configuration token (optional) (*analyticsToken*). Analytics module description (optional) (*analyticsModuleDescription*). Analytics module to restore (optional) (*moduleToRestore*)

**Procedure:**

1. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
2. ONVIF Client retrieves a list of Analytics Configurations that supports non fixed AnalyticsModules by following the procedure mentioned in Annex A.16 with the following input and output parameters
   - out *analyticsConfListSupportsAnalyticsModules* - a list of Analytics configurations
3. If *analyticsConfListSupportsAnalyticsModules* is empty, set *nonFixedModuleSupported* = false and return to test procedure.
4. ONVIF Client configures media profile with Analytics Configuration from *analyticsConfListSupportsAnalyticsModules* list by following the procedure mentioned in Annex A.4 with the following input and output parameters
   - in *analyticsConfListSupportsAnalyticsModules* - list of Analytics configurations.
   - out *profile* - media profile.
5. Set *analyticsToken* := *profile*.Configurations.Analytics.token
6. ONVIF Client retrieves a list of supported analytics modules by following the procedure mentioned in Annex A.17 with the following input and output parameters
   - in *analyticsToken* - a token of Analytics Configuration
   - out *supportedAnalyticsModules* - supported analytics modules.
7. If *supportedAnalyticsModules*.AnalyticsModuleDescription list is empty, FAIL the test and skip other steps.
8. Set *analyticsModuleDescription* := first *supportedAnalyticsModules*.AnalyticsModuleDescription item with @fixed != true.
9. If *analyticsModuleDescription* does not contain maxInstances attribute, FAIL the test.
10. If *analyticsModuleDescription*.@maxInstances = 0, FAIL the test.
11. ONVIF Client prepares free space for adding of new analytics module with required type into the Analytics Configuration by following the procedure mentioned in Annex A.18 with the following input and output parameters
    - in *analyticsToken* - a token of Analytics Configuration
    - in *analyticsModuleDescription*.@Name - analytics module type

- in *analyticsModuleDescription*.@maxInstances - maximum number of instances per configuration
- out *moduleToRestore* (optional) - analytics module to restore

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## A.24 Select Existing Analytics Module

**Name:** HelperSelectExistingAnalyticsModule

**Procedure Purpose:** Helper procedure to select Analytics Module existing on the device.

**Pre-requisite:** Analytics Service is received from the DUT. Analytics Modules is supported by the DUT.

**Input:** None.

**Returns:** Analytics module (optional) (*analyticsModule*), Analytics Configuration token (*analyticsToken*).

**Procedure:**

1. ONVIF Client retrieves a list of Analytics Configurations by following the procedure mentioned in Annex A.1 with the following input and output parameters
   - out *analyticsConfList* - a list of Analytics configurations
2. For each Analytics Configuration *analyticsConf* in *analyticsConfList* repeat the following steps:
   2.1. ONVIF Client retrieves a set of analytics modules assigned of Analytics Configuration by following the procedure mentioned in Annex A.20 with the following input and output parameters
      - in *analyticsConf*.@token - a token of Analytics Configuration
      - out *analyticsModuleList* - analytics module list
   2.2. If *analyticsModuleList* list is not empty

2.2.1.Set *analyticsModule* := *analyticsModuleList*[0].

2.2.2.Set *analyticsToken* := *analyticsConf*.@token.

2.2.3.Return to test procedure.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## A.25 Check Shape Descriptor Coordinates

**Name:** HelperSelectExistingAnalyticsModule

**Procedure Purpose:** Helper procedure to check that object bounding boxes or shapes included into sample frame of GetSupportedMetadataResponse are located in the top left quarter of the image.

**Pre-requisite:** None.

**Input:** SampleFrame *sampleFrame*

**Returns:** None.

**Procedure:**

1. Set *translateX* = 0.
2. Set *translateY* = 0.
3. Set *scaleX* = 1.
4. Set *scaleY* = 1.
5. If *sampleFrame* contains Transformation element, rewrite variables:
   5.1. If *sampleFrame*.Transformation.Translate.@x is specified, set *translateX* = *sampleFrame*.Transformation.Translate.@x.
   5.2. If *sampleFrame*.Transformation.Translate.@y is specified, set *translateY* = *sampleFrame*.Transformation.Translate.@y.
   5.3. If *sampleFrame*.Transformation.Scale.@x is specified, set *scaleX* = *sampleFrame*.Transformation.Scale.@x.

5.4. If *sampleFrame*.Transformation.Scale.@y is specified, set *scaleY* = *sampleFrame*.Transformation.Scale.@y.

6. For each Object.Appearance with Shape element (*appearance*) in *sampleFrame* repeat the following steps:

6.1. If *appearance* contains Transformation element, rewrite variables:

6.1.1. If *appearance*.Transformation.Translate.@x is specified, set *translateX* = *appearance*.Transformation.Translate.@x. Otherwise set *translateX* = 0.

6.1.2. If *appearance*.Transformation.Translate.@y is specified, set *translateY* = *appearance*.Transformation.Translate.@y. Otherwise set *translateY* = 0.

6.1.3. If *appearance*.Transformation.Scale.@x is specified, set *scaleX* = *appearance*.Transformation.Scale.@x. Otherwise set *scaleX* = 1.

6.1.4. If *appearance*.Transformation.Scale.@y is specified, set *scaleY* = *appearance*.Transformation.Scale.@y. Otherwise set *scaleY* = 1.

6.2. If *appearance*.Shape contains BoundingBox element:

6.2.1. ONVIF Client transforms bottom coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Shape.BoundingBox.@bottom - coordinate of point to transform
- in *translateY* - Translational value
- in *scaleY* - Scaling value
- out *bottom* - bottom in default coordinate system

6.2.2. ONVIF Client transforms top coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Shape.BoundingBox.@top - coordinate of point to transform
- in *translateY* - Translational value
- in *scaleY* - Scaling value
- out *top* - top in default coordinate system

6.2.3. ONVIF Client transforms right coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Shape.BoundingBox.@right - coordinate of point to transform
- in *translateX* - Translational value
- in *scaleX* - Scaling value
- out *right* - right in default coordinate system

6.2.4. ONVIF Client transforms left coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Shape.BoundingBox.@left - coordinate of point to transform
- in *translateX* - Translational value
- in *scaleX* - Scaling value
- out *left* - left in default coordinate system

6.2.5. If *bottom* > 1 or *bottom* < 0, FAIL the test.

6.2.6. If *top* > 1 or *top* < 0, FAIL the test.

6.2.7. If *right* > 0 or *top* < -1, FAIL the test.

6.2.8. If *left* > 0 or *top* < -1, FAIL the test.

6.2.9. For each *appearance*.Polygon.Point:

6.2.9.1 ONVIF Client transforms X coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Polygon.Point.@x - coordinate of point to transform
- in *translateX* - Translational value
- in *scaleX* - Scaling value
- out *pointX* - X of point in default coordinate system

6.2.9.2 ONVIF Client transforms Y coordinate to default coordinate system by following the procedure mentioned in Annex A.26 with the following input and output parameters

- in *appearance*.Polygon.Point.@y - coordinate of point to transform
- in *translateY* - Translational value
- in *scaleY* - Scaling value
- out *pointY* - Y of point in default coordinate system

6.2.9.3 If *pointY* > 1 or *bottom* < 0, FAIL the test.

6.2.9.4 If *pointX* > 0 or *top* < -1, FAIL the test.

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.

## A.26 Transform Coordinate To Default Coordinate System

**Name:** HelperTransformCoordinateToDefaultCoordinateSystem

**Procedure Purpose:** Helper procedure to transform coordinate into default coordinate system.

**Pre-requisite:** None.

**Input:** Coordinate of point to transform *coordinate*, Scaling value *scale*, Translational value (*translate*).

**Returns:** Coordinate of point transformed into default coordinate system *coordinate*.

**Procedure:**

1. Set *coordinate* = *coordinate* * *scale* + *translate*

**Procedure Result:**

**PASS –**

- DUT passes all assertions.

**FAIL –**

- None.