ONVIF™

Analytics Engine Device Test Specification

Version 18.06

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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 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 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 ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT added
17.12	Jul 24, 2017	The following test cases were changed according to #1444: ANALYTICS-1-1-2 GET MOTION REGION DETECTOR RULE OPTIONS ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT
17.12	Jul 24, 2017	The following test cases were changed according to #1445: ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT
17.12	Sept 18, 2017	The following test cases were added according to #1477: ANALYTICS-3-1-1 Get Services and Get Analytics Service Capabilities Consistency
17.12	Oct 16, 2017	Pre-Requisite of the following test cases were updated according to #1185: GET SUPPORTED RULES (MOTION REGION DETECTOR) GET MOTION REGION DETECTOR RULE OPTIONS CREATE MOTION REGION DETECTOR RULE MODIFY MOTION REGION DETECTOR RULE MOTION REGION DETECTOR EVENT
17.12	Nov 22, 2017	The following test case was updated according to #1184: ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT
17.12	Nov 28, 2017	The following test cases were updated according to #1398:

		ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT The following annexes were added according to #1398: Annex A.8 Calculate Free Space for Rule Annex A.9 Delete Rule with Requested Type The following test cases were updated according to #1185: ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT
18.06	Jan 22, 2018	The following test cases were updated according to #1557: ANALYTICS-1-1-3 CREATE MOTION REGION DETECTOR RULE ANALYTICS-1-1-4 MODIFY MOTION REGION DETECTOR RULE ANALYTICS-2-1-1 MOTION REGION DETECTOR EVENT The following annexes was added: Annex A.10 Create Motion Region Detector Rule
18.06	Jun 21, 2018	Reformatting document using new template

Table of Contents

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 Analytics Engine

Analytics Engine covers the test cases needed for the verification of Rule interface as mentioned in [ONVIF Network Interface Specs].

The scope of this specification covers the following features of Rule interface:

- Motion Detection
- Operations on rules
- Motion Region Detector event

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.

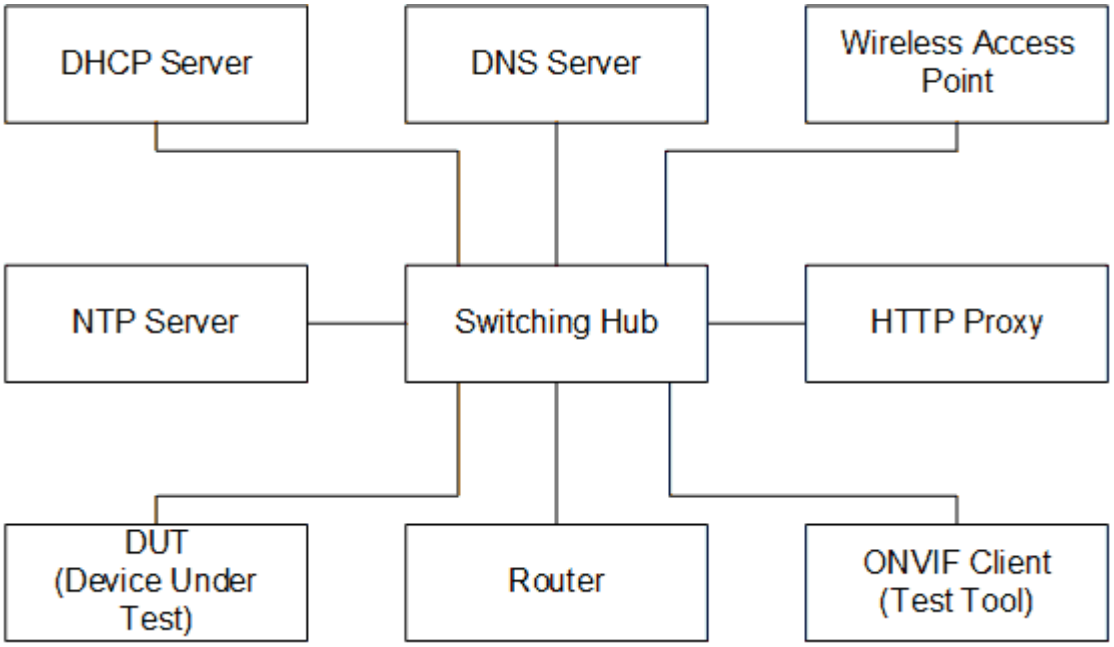
4.1 Test Setup

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.

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.

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 Parameters.ElementItemDescription element with Name attribute value is equal to "MotionRegion", FAIL the test and skip other steps.

4.3.2. 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.

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

4.3.4. 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.

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

4.3.6. 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.

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

4.3.8. 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.

4.3.9. 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 [16], 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**, FAIL the test and skip other steps.

   5.4. If RuleOption element with @Name = **MotionRegion** and with @Type = **axt:MotionRegionConfigOptions** 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**, FAIL the test and skip other steps.

8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** 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**.

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 [21].

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
- 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

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 [21], 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 [21] and at step 15.2 [22].
26. ONVIF Client restores media profile if it was changed at step 5 [20].

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 [24]:

- 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
- 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**, FAIL the test and skip other steps.
8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** 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**.
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
- 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 + *profile*.Configurations.VideoSource.Bounds.@height - 1)/2]
- 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 [26], 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 [26].
21. ONVIF Client restores media profile if it was changed at step 5 [26].

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 [26] means integer part of value (floor function).

Note: The following fields are compared at step 17 [28]:

- 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
- 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**, FAIL the test and skip other steps.
8. If RuleOption element with @Name = **MotionRegion** and @Type = **axt:MotionRegionConfigOptions** 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**.
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. 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

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

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

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

    - Timeout := PT60S
    - MessageLimit := 1

    22.3. The DUT responds with **PullMessagesResponse** message with parameters

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

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

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

    22.6. 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:

        22.6.1. If *motionRegionConfigOptions*.MotionRegionConfigOptions.RuleNotification is not equal to true, go to step 23 [32].

        22.6.2. If *notificationMessageList*[0] has Source.SimpleItem with Name = "RuleName" and with Value = "TestMotionRegion", go to step 23 [32].

    22.7. If *timeout1* timeout expires for step 22 without Notification corresponds to step 22.6 [32], FAIL the test and skip other steps.

23. 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.

24. ONVIF Client invokes **DeleteRules** request with parameters

- ConfigurationToken := *profile*.Configurations.Analytics.@token
- RuleName := TestMotionRegion

25. The DUT responds with **DeleteRulesResponse**.
26. ONVIF Client restores rule if it was deleted at step 10 [30].
27. ONVIF Client restores media profile if it was changed at step 5 [30].
28. 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 Service 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, 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.

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 [45].
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
   - 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

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.