ONVIF™
Profile Q Test Specification

Version 18.06
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## REVISION HISTORY

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<td>15.06</td>
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<td>The following test cases were updated: Factor Default state verification&lt;br&gt;Default access policy - Operator&lt;br&gt;Default access policy - Administrator and Anonymous&lt;br&gt;Default access policy - Administrator and User/Operator&lt;br&gt;Processor Usage event&lt;br&gt;Last Reboot event (Status Change)&lt;br&gt;Firmware Upload</td>
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<td>16.01</td>
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<td>The parameter value &quot;UTCDateTime&quot; has been changed in step 7 of QUICK_INSTALL-3-1-7 and step 10 of QUICK_INSTALL-3-1-6.&lt;br&gt;Clarifications have been added to steps 6-7 of QUICK_INSTALL-3-1-4. The FAIL condition: &quot;The DUT did not send UnsubscribeResponse message.&quot; has been removed from test QUICK_INSTALL-3-1-4.&lt;br&gt;The steps 32-34 have been added to section 4.1.1 (QUICK_INSTALL-1-1-1)&lt;br&gt;The steps 8-10 have been added to section 4.3.2 (QUICK_INSTALL-4-1-2)</td>
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<td>Note added in the following test cases and annex according to #1564&lt;br&gt;QUICK_INSTALL-1-1-1 Factory default state verification&lt;br&gt;QUICK_INSTALL-2-1-4 Default access policy - Administrator and Anonymous&lt;br&gt;QUICK_INSTALL-2-1-5 Default access policy - Administrator And User/Operator&lt;br&gt;A.1 Create user with defined user level</td>
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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 Profile Q Test Specification acts as a supplementary document to the [ONVIF Core Specs], illustrating test cases need to be executed and passed. In addition, this specification acts as an input document to the development of test tool that 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 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 is to provide the test cases to test individual requirements of ONVIF devices according to ONVIF core services which are defined in [ONVIF Network Interface Specs].

The principal intended purposes are:

2. Provide comprehensive test suite coverage for [ONVIF Network Interface Specs].

This specification does not address the following:

1. Product use cases and non-functional (performance and regression) testing.
2. SOAP Implementation Interoperability test i.e. Web Service Interoperability Basic Profile version 2.0 (WS-I BP 2.0).
3. Network protocol implementation Conformance test for HTTP, HTTPS, RTP and RTSP protocol.
4. 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 Profile Q Test Specification covers the Profile Q conformant transition from a device (unsecure) status after a factory reset command has been executed up to ONVIF Default Access
Policy is applied. The following sections describe the brief overview and scope of each functional block.

1.1.1 General

The General section covers the test cases needed for checking of Factory Default state and Operational state of the device.

The scope of this specification section is to cover the following functions:

- Turn device to Factory Default state with SetSystemFactoryDefault command
- Turn device to Operational state with creation of user with Administrator user level by CreateUsers and SetUser command
- Check scopes Factory Default state and Operational state

1.1.2 Default Access Policy

The Default Access Policy section covers the test cases needed for checking of operations in the PRE_AUTH, READ_SYSTEM, READ_MEDIA, ACTUATE, UNRECOVERABLE, WRITE_SYSTEM and READ_SYSTEM_SECRET access classes.

1.1.3 System

The System section covers the test cases needed for ONVIF device firmware upgrade via HTTP.

The scope of this specification section is to cover the following functions:

- Upgrade of firmware with StartFirmwareUpgrade command
- Check ONVIF device state after firmware upgrade.
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 Profile Q Specs] ONVIF Profile Q Specification:
  https://www.onvif.org/profiles/

  http://www.iso.org/directives


- [SOAP 1.2, Part 1] W3C SOAP 1.2, Part 1, Messaging Framework:
  http://www.w3.org/TR/soap12-part1/

  http://www.w3.org/TR/xmlschema-1/

  http://www.w3.org/TR/xmlschema-2/

  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 Definitions

This section defines terms that are specific to the ONVIF Profile Q and tests. For a list of applicable general terms and definitions, please see [ONVIF Base Test].

3.2 Abbreviations

This section describes abbreviations used in this document.

DUT  Device Under Test
HTTP Hyper Text Transport Protocol
RTCP RTP Control Protocol
RTSP Real Time Streaming Protocol
DHCP Dynamic Host Configuration Protocol
IP Internet Protocol
IPv4 Internet Protocol version 4
NTP Network Time Protocol
UTC Coordinated Universal Time
4 Test Overview

This section provides information the test setup procedure and required prerequisites, 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.

### 4.2 Prerequisites

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

- The DUT shall be in out-of-the-box state.

Test Operator shall configure Reboot Timeout properly so that it would have enough time to reboot device for the following test cases for ONVIF Device Test Tool (see test description for more details):

- 5.1.1 Factory default state verification
- 5.3.1 Firmware Upload

### 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 General

The DUT shall give the DeviceService entry point and EventService entry point by GetServices command. Otherwise these test cases will be skipped.

- DUT shall support the following commands:
  - GetServices
  - GetServiceCapabilities
- DUT shall support HTTP Digest authentication
- DUT shall support set of user name with user name length equals to MaxUsernameLength
- DUT shall support set of user password with user password length equals to MaxPasswordLength
- DUT shall allow full anonymous access after hard SystemFactoryDefault
• DUT shall have `onvif://www.onvif.org/Profile/Q/FactoryDefault` scope after hard SystemFactoryDefault

• DUT shall not have `onvif://www.onvif.org/Profile/Q/Operational` scope after hard SystemFactoryDefault

• DUT shall have IPv4 network interface on DHCP after hard SystemFactoryDefault

• ZeroConfiguration shall be set to true after hard SystemFactoryDefault

• DUT shall conform to the access policy which is specified by Default Access Policy after create or set user with Administrator user level

• DUT shall have `onvif://www.onvif.org/Profile/Q/Operational` scope create or set user with Administrator user level

• DUT shall not have `onvif://www.onvif.org/Profile/Q/FactoryDefault` scope after create or set user with Administrator user level

• The following tests are performed
  • Quick Install SetSystemFactoryDefault state verification

Please refer to Section 5.1 General Test Cases.

4.3.2 Default Access Policy

The Default Access Policy section covers the test cases needed for check of access policy on the DUT.

• The DUT shall support Default Access Policy

• DUT shall conform to the access policy which is specified by Default Access Policy

• The DUT shall support HTTP Digest Authentication

• The following tests are performed
  • Default Access Policy – Anonymous
  • Default Access Policy – User
  • Default Access Policy – Operator
  • Default access policy - Administrator and Anonymous
  • Default access policy - Administrator and User/Operator
Please refer to Section 5.2 for Default Access Policy Test Cases.

4.3.3 System

The System section covers the test cases with firmware upgrade via HTTP.

- DUT shall support HttpFirmwareUpgrade.
- DUT shall returns HTTP 415 message in case invalid firmware file.
- The following tests are performed
  - Firmware Upgrade via HTTP with valid firmware file
  - Firmware Upgrade via HTTP with invalid firmware file

Please refer to Section 5.3 for System Test Cases.
5 Quick Install Test Cases

5.1 General

5.1.1 Factory default state verification

Test Case ID: QUICK_INSTALL-1-1-1

Specification Coverage: Factory Default, CreateUsers (ONVIF Core Specification), SetUser (ONVIF Core Specification)

Feature Under Test: SetSystemFactoryDefault, CreateUsers, SetUsers

WSDL Reference: devicemgmt.wsdl

Test Purpose: To verify transition from FactoryDefault state to Operational state.

Pre-Requisite: GetServices command is supported by the DUT. Default Access Policy is supported by the DUT as indicated by the Security.DefaultAccessPolicy capability. HTTP Digest Authentication is supported by the DUT as indicated by the Security.HttpDigest capability. ZeroConfiguration is supported by the DUT as indicated by the Network.ZeroConfiguration capability. Maximum Username Length is supported by the DUT as indicated by the Capabilities.Security.MaxUsernameLength, Maximum Password Length is supported by the DUT as indicated by the Capabilities.Security.MaxPasswordLength.

Test Configuration: ONVIF Client and DUT

Test Procedure:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client invokes **SetSystemFactoryDefault** with parameters
   - FactoryDefault := Hard
4. DUT responds with a **SetSystemFactoryDefaultResponse** message.
5. Until **timeout1** timeout expires, repeat the following steps:
   5.1. The DUT will send Multicast **Hello** message after it is successfully rebooted with parameters:
• EndpointReference.Address equal to unique endpoint reference of the DUT

• Types list

• Scopes list := scopesList

• XAddrs list := xaddrsList

• MetadataVersion

5.2. If xaddrsList contains URI address with not a LinkLocal IPv4 address from ONVIF Client subnet, go to step 7.

6. If timeout1 timeout expires for step 5 without Hello with URI address with not a LinkLocal IPv4 address from ONVIF Client subnet, FAIL the test and skip other steps.

7. ONVIF client waits for 5 seconds after Hello was received.

8. ONVIF client checks the following:

   • If scopesList does not contain "onvif://www.onvif.org/Profile/Q/FactoryDefault" scope, FAIL the test and skip other steps.

   • If scopesList contains "onvif://www.onvif.org/Profile/Q/Operational" scope, FAIL the test and skip other steps.

9. ONVIF Client synchronize a time between ONVIF Client and DUT by following the procedure mentioned in Annex A.3

10. ONVIF Client gets the service capabilities without any authentication (out cap) by following the procedure mentioned in Annex A.2.

11. ONVIF client invokes GetNetworkInterfaces without any authentication.

12. The DUT responds with GetNetworkInterfacesResponse message with parameters

   • NetworkInterfaces.token1 =: currentNetInt, where token1 is token of the currently used network interface

13. If currentNetInt.IPv4.DHCP is not equal to true, FAIL the test and skip other steps.

14. If cap contains Network.IPVersion6 item and cap.Network.IPVersion6 equals to true:

   • If currentNetInt.IPv6.Enabled is not equal to true, FAIL the test and skip other steps.

   • If currentNetInt.IPv6.Config does not contain at least one LinkLocal item with not empty Address item, FAIL the test and skip other steps.
• If `currentNetInt.IPv6.Config.AcceptRouterAdvert` is not equal to true, FAIL the test and skip other steps.

15. ONVIF client invokes **GetZeroConfiguration** without any authentication.

16. The DUT responds with **GetZeroConfigurationResponse** message with parameters

   • `ZeroConfiguration` = `zeroConfiguration`

17. If `zeroConfiguration.Enabled` is not equal to true, FAIL the test.

18. ONVIF Client invokes **GetScopes** without any authentication.

19. DUT responds with a **GetScopesResponse** message with parameters

   • `Scope list` = `initialScopeList`

20. If `initialScopeList` does not contain "onvif://www.onvif.org/Profile/Q/FactoryDefault" scope, FAIL the test.

21. If `initialScopeList` contains "onvif://www.onvif.org/Profile/Q/Operational" scope, FAIL the test.

22. ONVIF Client invokes Unicast **Probe** message with the following parameters

   • Types empty
   • Scopes empty

23. DUT responds with a **ProbeMatch** message with parameters:

   • `ProbeMatch.Scopes`

24. Set the following:

   • `initialScopeList := ProbeMatch.Scopes`

25. If `initialScopeList` does not contain "onvif://www.onvif.org/Profile/Q/FactoryDefault" scope, FAIL the test and skip other steps.

26. If `initialScopeList` contains "onvif://www.onvif.org/Profile/Q/Operational" scope, FAIL the test and skip other steps.

27. If `cap` does not contain `Security.MaxPasswordLength` or `Security.MaxUserNameLength`, FAIL the test and skip other steps.

28. ONVIF Client invokes **GetUsers** without any authentication.

29. DUT responds with a **GetUsersResponse** message with parameters.
• User list =: userList

30. If userList contains user with user level Administrator:

30.1. Set the following:

• passwordLength := cap.Security.MaxPasswordLength

• userLogin := Username of user with user level equal to Administrator from userList

• password := random string, contains passwordLength ASCII characters

30.2. ONVIF Client invokes **SetUser** with parameters

• User[0].Username := userLogin

• User[0].Password := password

• User[0].UserLevel := Administrator

• Extension skipped

30.3. If the DUT responds with **SetUserResponse** message, go to 32.

30.4. If DUT returns env:Sender\ter:OperationProhibited\ter:Password SOAP 1.2 fault:

30.4.1. Set the following:

• password := random string, contains passwordLength ASCII characters

30.4.2. Go to the step 30.2.

30.5. If DUT returns other SOAP 1.2 fault, FAIL the test and skip other steps.

31. If userList does not contain user with user level Administrator:

31.1. Set the following:

• userLoginLength := cap.Security.MaxUserNameLength

• passwordLength := cap.Security.MaxPasswordLength

• userLogin := random string, contains userLoginLength low case alphabet characters, differs from usernames listed in userList

• password := random string, contains passwordLength ASCII characters

31.2. ONVIF Client invokes **CreateUsers** with parameters
• User[0].Username := userLogin

• User[0].Password := password

• User[0].UserLevel := Administrator

• Extension skipped

31.3. If the DUT responds with CreateUsersResponse message, go to 32.

31.4. If the DUT returns env:Sender\ter:OperationProhibited\ter:Password SOAP 1.2 fault:

31.4.1. Set the following:

• password := random string, contains passwordLength ASCII characters

31.4.2. Go to the step 31.2.

31.4.3. If DUT returns other SOAP 1.2 fault, FAIL the test and skip other steps.

32. ONVIF Client waits the Reboot Timeout.

33. ONVIF Client sends Probe message and if DUT responds with ProbeMatch message then go to the step 35

34. ONVIF Client waits for Hello message sent from newly configured address by the DUT. Then ONVIF Client starts using this newly configured address for further communications with DUT.

35. Until timeout1 expires, repeat the following steps:

35.1. ONVIF Client invokes Unicast Probe message with the following parameters

• Types empty

• Scopes empty

35.2. If the DUT responds with ProbeMatch message:

35.2.1. Set the following:

• updatedScopeList := ProbeMatch.Scopes

35.2.2. If updatedScopeList contains "onvif://www.onvif.org/Profile/Q/Operational" scope, go to the step 35.
35.3. If timeout1 timeout expires for step 35 without **ProbeMatch** message with "onvif://www.onvif.org/Profile/Q/Operational" scope in **updatedScopeList**, FAIL the test and skip other steps.

36. If **updatedScopeList** contains "onvif://www.onvif.org/Profile/Q/FactoryDefault" scope, FAIL the test and skip other steps.

37. ONVIF Client invokes **GetUsers** with user with the user level Administrator credentials (**userLogin** and **password**).

38. DUT responds with a **GetUsersResponse** message with parameters.

   • User list = **: updatedUserList**

39. If **updatedUserList** does not contain Username = **userLogin** with UserLevel = Administrator, FAIL the test and skip other steps.

40. ONVIF Client invokes **GetScopes** with the user level Administrator credentials (**userLoginUser** and **passwordUser**)

41. The DUT responds with a GetScopesResponse message with parameters

   • Scope list = **: updatedScopeList**

42. If **updatedScopeList** contains "onvif://www.onvif.org/Profile/Q/FactoryDefault" scope, FAIL the test and skip other steps.

43. If **updatedScopeList** does not contain "onvif://www.onvif.org/Profile/Q/Operational" scope, FAIL the test and skip other steps.

**Procedure Result:**

**PASS** –

• DUT passes all assertions.

**FAIL** –

• The DUT did not send **SetSystemFactoryDefaultResponse** message.

• The DUT did not send **GetUsersResponse** message.

• The DUT did not send **SetUsersResponse** message.

• The DUT did not send **CreateUsersResponse** message.

• The DUT did not send **GetZeroConfigurationResponse** message.
• The DUT did not send `GetNetworkInterfacesResponse` message.

• The DUT did not send `GetScopesResponse` message.

• The DUT did not allow Anonymous access to the `GetNetworkInterfaces` command.

• The DUT did not allow Anonymous access to the `GetZeroConfiguration` command.

• The DUT did not allow Anonymous access to the `GetUsers` command before changing the user with the user level Administrator credentials.

• The DUT did not allow Anonymous access to the `SetUsers` command before changing the user with the user level Administrator credentials.

• The DUT did not allow Anonymous access to the `CreateUsers` command before changing the user with the user level Administrator credentials.

• The DUT did not allow Anonymous access to the `GetScopes` command before changing the user with the user level Administrator credentials.

• The DUT allowed Anonymous access to the `GetUsers` command after changing the user with the user level Administrator credentials.

• The DUT allowed Anonymous access to the `GetScopes` command after changing the user with the user level Administrator credentials.

**Note:** User with username `userLogin` and password `password` shall be used for further test cases.

**Note:** `timeout1` will be taken from Operation Delay field of ONVIF Device Test Tool.

**Note:** IPv4 address from Hello shall be used for further test cases.

**Note:** ONVIF client uses password values from Management tab for CreateUsers and StUser operations if 'Provide own passwords' is active on Management tab.

### 5.2 Default access policy

#### 5.2.1 Default access policy - Anonymous

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

**Specification Coverage:** Default access policy

**Feature Under Test:** GetServices, GetServiceCapabilities, GetHostname, GetSystemDateAndTime
WSDL Reference: devicemgmt.wsdl

Test Purpose: To verify that operations in the PRE_AUTH access class can be accessed without authentication being required.

Pre-Requisite: GetServices command is supported by the DUT. Default Access Policy is supported by the DUT as indicated by the Security.DefaultAccessPolicy capability. HTTP Digest Authentication is supported by the DUT as indicated by the Security.HttpDigest capability. Default Access Policy is not modified.

Test Configuration: ONVIF Client and DUT

Test Sequence:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF client invokes GetServices for Device service without any authentication with parameters
   • IncludeCapability := false
4. The DUT responds with GetServicesResponse message with parameters
   • Service list
5. ONVIF client invokes GetServiceCapabilities for Device Service without any authentication.
6. The DUT responds with GetServiceCapabilitiesResponse message with parameters
   • Capabilities
7. ONVIF client invokes GetHostname without any authentication.
8. The DUT responds with GetHostnameResponse message with parameters
   • HostnameInformation
9. ONVIF client invokes GetSystemDateAndTime without any authentication.
10. The DUT responds with GetSystemDateAndTimeResponse message with parameters
    • SystemDateAndTime

Test Result:

PASS –
• The DUT passed all assertions.

FAIL –

• The DUT did not allow Anonymous access to the GetServices command.
• The DUT did not allow Anonymous access to the GetServiceCapabilities command.
• The DUT did not allow Anonymous access to the GetHostname command.
• The DUT did not allow Anonymous access to the GetSystemDateAndTime command.
• The DUT did not send GetServicesResponse message.
• The DUT did not send GetServiceCapabilitiesResponse message.
• The DUT did not send GetHostnameResponse message.
• The DUT did not send GetSystemDateAndTimeResponse message.

5.2.2 Default access policy - User

Test Case ID: QUICK_INSTALL-2-1-2

Specification Coverage: Default access policy

Feature Under Test: GetNTP, GetNetworkInterfaces, GetScopes, GetDiscoveryMode, GetEventProperties

WSDL Reference: devicemgmt.wsdl

Test Purpose: To verify that operations in the READ_SYSTEM and READ_MEDIA access classes can be accessed with authentication level User.

Pre-Requisite: GetServices command is supported by the DUT. Event Service was received from the DUT. Default Access Policy is supported by the DUT as indicated by the Security.DefaultAccessPolicy capability. HTTP Digest Authentication is supported by the DUT as indicated by the Security.HttpDigest capability. Maximum Username Length is supported by the DUT as indicated by the Capabilities.Security.MaxUsernameLength, Maximum Password Length is supported by the DUT as indicated by the Capabilities.Security.MaxPasswordLength. Default Access Policy is not modified.

Test Configuration: ONVIF Client and DUT

Test Sequence:

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

3. Set the following:
   - `userLevel := User`

4. ONVIF Client generates creates user with predefined user level (in `userLevel`) and user login (out `userLogin`) and password (out `password`) by following the procedure mentioned in Annex A.1.

5. If the DUT supports NTP as indicated by Network.NTP capability:
   5.1. ONVIF client invokes `GetNTP` without any authentication.
   5.2. The DUT responds with **HTTP 401 Unauthorized** error.
   5.3. ONVIF client invokes `GetNTP` with user with the user level User credentials (`userLogin` and `password`).
   5.4. The DUT responds with `GetNTPResponse` message with parameters
       - `NTPInformation`

6. ONVIF client invokes `GetNetworkInterfaces` without any authentication.

7. The DUT responds with **HTTP 401 Unauthorized** error.

8. ONVIF client invokes `GetNetworkInterfaces` with user with the user level User credentials (`userLogin` and `password`).

9. The DUT responds with `GetNetworkInterfacesResponse` message with parameters
   - `NetworkInterfaces list`

10. ONVIF client invokes `GetScopes` without any authentication.

11. The DUT responds with **HTTP 401 Unauthorized** error.

12. ONVIF client invokes `GetScopes` with user with the user level User credentials (`userLogin` and `password`).

13. The DUT responds with `GetScopesResponse` message with parameters
    - `Scopes list`

14. ONVIF client invokes `GetDiscoveryMode` without any authentication.

15. The DUT responds with **HTTP 401 Unauthorized** error.
16. ONVIF client invokes **GetDiscoveryMode** with user with the user level User credentials (*userLogin* and *password*).

17. The DUT responds with **GetDiscoveryModeResponse** message with parameters

   - DiscoveryMode

18. ONVIF client invokes **GetEventProperties** without any authentication.

19. The DUT responds with **HTTP 401 Unauthorized** error.

20. ONVIF client invokes **GetEventProperties** with user with the user level User credentials (*userLogin* and *password*).

21. The DUT responds with **GetEventPropertiesResponse** message with parameters

   - TopicNamespaceLocation list
   - FixedTopicSet
   - TopicSet
   - TopicExpressionDialect list
   - MessageContentFilterDialect list
   - ProducerPropertiesFilterDialect list
   - MessageContentSchemaLocation list
   - Other additional fields if any

**Test Result:**

**PASS** –

- The DUT passed all assertions.

**FAIL** –

- The DUT allow Anonymous access to the **GetNTP** command.
- The DUT allow Anonymous access to the **GetNetworkInterfaces** command.
- The DUT allow Anonymous access to the **GetScopes** command.
- The DUT allow Anonymous access to the **GetDiscoveryMode** command.
- The DUT allow Anonymous access to the **GetEventProperties** command.
• The DUT did not allow user with the user level User access to the GetNTP command.

• The DUT did not allow user with the user level User access to the GetNetworkInterfaces command.

• The DUT did not allow user with the user level User access to the GetScopes command.

• The DUT did not allow user with the user level User access to the GetDiscoveryMode command.

• The DUT did not allow user with the user level User access to the GetEventProperties command.

• The DUT did not send GetNTPResponse message.

• The DUT did not send GetNetworkInterfacesResponse message.

• The DUT did not send GetScopesResponse message.

• The DUT did not send GetDiscoveryModeResponse message.

• The DUT did not send GetEventPropertiesResponse message.

5.2.3 Default access policy - Administrator and Anonymous

Test Case ID: QUICK_INSTALL-2-1-4

Specification Coverage: Default access policy

Feature Under Test: SetScopes, SetDiscoveryMode, GetAccessPolicy, CreateUsers, SetSystemDateAndTime

WSDL Reference: devicemgmt.wsdl

Test Purpose: To verify that operations in the UNRECOVERABLE, WRITE_SYSTEM and READ_SYSTEM_SECRET access classes can not be accessed without authentication level Administrator.

Pre-Requisite: GetServices command is supported by the DUT. Default Access Policy is supported by the DUT as indicated by the Security.DefaultAccessPolicy capability. HTTP Digest Authentication is supported by the DUT as indicated by the Security.HttpDigest capability. Default Access Policy is not modified.

Test Configuration: ONVIF Client and DUT

Test Sequence:
1. Start an ONVIF Client.

2. Start the DUT.

3. ONVIF Client gets the service capabilities (out cap) by following the procedure mentioned in Annex A.2.

4. ONVIF client invokes `SetScopes` without any authentication with parameters
   - `Scopes[0] := "onvif://www.onvif.org/location/test"`

5. The DUT responds with **HTTP 401 Unauthorized** error.

6. ONVIF client invokes `SetDiscoveryMode` without any authentication with parameters
   - `DiscoveryMode := Discoverable`

7. The DUT responds with **HTTP 401 Unauthorized** error

   8.1. ONVIF client invokes `GetAccessPolicy` without any authentication.
   8.2. The DUT responds with **HTTP 401 Unauthorized** error.

9. ONVIF client invokes `CreateUsers` without any authentication with parameters.
   - `User[0].Username := "Test"`
   - `User[0].Password := "Test"`
   - `User[0].UserLevel := Administrator`
   - Extension skipped

10. The DUT responds with **HTTP 401 Unauthorized** error.

11. ONVIF client invokes `SetSystemDateAndTime` without any authentication with parameters
    - `DateTimeType := NTP`
    - `DaylightSavings := true`
    - `TimeZone skipped`
    - `UTCDatetime skipped`

12. The DUT responds with **HTTP 401 Unauthorized** error.
Test Result:

PASS –

• The DUT passed all assertions.

FAIL –

• The DUT allowed Anonymous access to the **SetScopes** command.
• The DUT allowed Anonymous access to the **SetDiscoveryMode** command.
• The DUT allowed Anonymous access to the **GetAccessPolicy** command.
• The DUT allowed Anonymous access to the **CreateUsers** command.
• The DUT allowed Anonymous access to the **SetSystemDateAndTime** command.

**Note:** ONVIF client uses password values from Management tab for CreateUsers and StUser operations if 'Provide own passwords' is active on Management tab.

5.2.4 Default access policy - Administrator And User/Operator

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

**Specification Coverage:** Default access policy

**Feature Under Test:** SetScopes, SetDiscoveryMode, GetAccessPolicy, CreateUsers, SetSystemDateAndTime

**WSDL Reference:** devicemgmt.wsdl

**Test Purpose:** To verify that operations in the UNRECOVERABLE, WRITE_SYSTEM and READ_SYSTEM_SECRET access classes can not be accessed without authentication level Administrator.

**Pre-Requisite**:
- GetServices command is supported by the DUT. Default Access Policy is supported by the DUT as indicated by the Security.DefaultAccessPolicy capability. HTTP Digest Authentication is supported by the DUT as indicated by the Security.HttpDigest capability. Maximum Username Length is supported by the DUT as indicated by the Capabilities.Security.MaxUsernameLength, Maximum Password Length is supported by the DUT as indicated by the Capabilities.Security.MaxPasswordLength.Default Access Policy is not modified.

**Test Configuration:** ONVIF Client and DUT

**Test Sequence:**

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

3. Set the following:
   
   • \texttt{userLevelUser} := User
   
   • \texttt{userLevelOperator} := Operator

4. ONVIF Client generates creates user with predefined user level (in \texttt{userLevelUser}) and user login (out \texttt{userLoginUser}) and password (out \texttt{passwordUser}) by following the procedure mentioned in Annex A.1.
   
   • \texttt{Scopes[0]} := "onvif://www.onvif.org/location/test"

5. ONVIF Client gets the service capabilities (out \texttt{cap}) by following the procedure mentioned in Annex A.2.

6. ONVIF client invokes \texttt{SetScopes} with user with the user level User credentials (\texttt{userLoginUser} and \texttt{passwordUser}) with parameters
   
   • \texttt{Scopes[0]} := "onvif://www.onvif.org/location/test"

7. The DUT responds with \texttt{HTTP 401 Unauthorized} error

8. ONVIF client invokes \texttt{SetDiscoveryMode} with user with the user level User credentials (\texttt{userLoginUser} and \texttt{passwordUser}) with parameters
   
   • \texttt{DiscoveryMode} := Discoverable

9. The DUT responds with \texttt{HTTP 401 Unauthorized} error.

10. If \texttt{cap.Security} contains AccessPolicyConfig and \texttt{cap.Security.AccessPolicyConfig} equals to true:
   
   10.1. ONVIF client invokes \texttt{GetAccessPolicy} with user with the user level User credentials (\texttt{userLoginUser} and \texttt{passwordUser}).

   10.2. The DUT responds with \texttt{HTTP 401 Unauthorized} error.

11. ONVIF client invokes \texttt{CreateUsers} with user with the user level User credentials (\texttt{userLoginUser} and \texttt{passwordUser}).
   
   • \texttt{User[0].Username} := "Test"

   • \texttt{User[0].Password} := "Test"

   • \texttt{User[0].UserLevel} := Administrator
• Extension skipped

12. The DUT responds with **HTTP 401 Unauthorized** error.

13. ONVIF client invokes **SetSystemDateAndTime** with user with the user level User credentials *(userLoginUser and passwordUser)*.
   - DateTimeType := NTP
   - DaylightSavings := true
   - TimeZone skipped
   - UTCDateTime skipped

14. The DUT responds with **HTTP 401 Unauthorized** error.

15. ONVIF Client generates creates user with predefined user level (in userLevelOperator) and user login (out userLoginOperator) and password (out passwordOperator) by following the procedure mentioned in Annex 1.

16. ONVIF client invokes **SetScopes** with user with the user level Operator credentials *(userLoginOperator and passwordOperator)* with parameters
   - DiscoveryMode := Discoverable

17. The DUT responds with **HTTP 401 Unauthorized** error.

18. ONVIF client invokes **SetDiscoveryMode** with user with the user level Operator credentials *(userLoginOperator and passwordOperator)* with parameters
   - DiscoveryMode := Discoverable

19. The DUT responds with **HTTP 401 Unauthorized** error.

   20.1. ONVIF client invokes **GetAccessPolicy** with user with the user level User credentials *(userLoginUser and passwordUser)*.
   20.2. The DUT responds with **HTTP 401 Unauthorized** error.

21. ONVIF client invokes **CreateUsers** with user with the user level User credentials *(userLoginUser and passwordUser)*.
   - User[0].Username := "Test"
• User[0].Password := "Test"

• User[0].UserLevel := Administrator

• Extension skipped

22. The DUT responds with **HTTP 401 Unauthorized** error.

23. ONVIF client invokes **SetSystemDateAndTime** with user with the user level User credentials (**userLoginUser** and **passwordUser**).

• DateTimeType := NTP

• DaylightSavings := true

• TimeZone skipped

• UTCDateTime skipped

24. The DUT responds with **HTTP 401 Unauthorized** error.

**Test Result:**

**PASS –**

• The DUT passed all assertions.

**FAIL –**

• The DUT allowed User access to the **SetScopes** command.

• The DUT allowed User access to the **SetDiscoveryMode** command.

• The DUT allowed User access to the **GetAccessPolicy** command.

• The DUT allowed User access to the **CreateUsers** command.

• The DUT allowed User access to the **SetSystemDateAndTime** command.

• The DUT allowed Operator access to the **SetScopes** command.

• The DUT allowed Operator access to the **SetDiscoveryMode** command.

• The DUT allowed Operator access to the **GetAccessPolicy** command.

• The DUT allowed Operator access to the **CreateUsers** command.

• The DUT allowed Operator access to the **SetSystemDateAndTime** command.
Note: ONVIF client uses password values from Management tab for CreateUsers and StUser operations if 'Provide own passwords' is active on Management tab.

5.3 System

5.3.1 Firmware Upload

Test Case ID: QUICK_INSTALL-4-1-1

Specification Coverage: Firmware Upload via HTTP

Feature Under Test: StartFirmwareUpgrade

WSDL Reference: devicemgmt.wsdl

Test Purpose: To verify that the firmware upgrade is correctly executed.

Pre-Requisite: GetServices command is supported by the DUT. HttpFirmwareUpgrade feature is supported by the DUT as indicated by the System.HttpFirmwareUpgrade. Location of Compatible firmware file is provided.

Test Configuration: ONVIF Client and DUT

Test Sequence:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client invokes GetUsers without any authentication.
4. The DUT responds with **HTTP 401 Unauthorized** error.
5. ONVIF Client invokes **GetUsers** with user with the user level Administrator credentials.
6. The DUT responds with a **GetUsersResponse** message with parameters
   - UserList
7. ONVIF Client invokes **StartFirmwareUpgrade**.
8. The DUT responds with a **StartFirmwareUpgradeResponse** message with parameters
   - UploadUri =: uploadUri
   - UploadDelay =: uploadDuration
   - ExpectedDownTime =: downTimeDuration
9. ONVIF Client waits for time uploadDuration.

10. ONVIF Client invokes HTTP POST to uploadUri with parameters
    • HTTP Header [Content-Type] := "application/octet-stream"
    • HTTP Body := compatible firmware file

11. The DUT responds with HTTP 200 OK message.

12. If BYE message is supported by the DUT as indicated by the System.DiscoveryBye capabilities, the DUT will send Multicast BYE message before rebooting with parameters
    • EndpointReference.Address equal to unique endpoint reference of the DUT
    • Types list
    • Scopes list
    • XAddrs list
    • MetadataVersion

13. Until timeout1 timeout expires, repeat the following steps

13.1. The DUT will send Multicast Hello message after it is successfully rebooted with parameters:
    • EndpointReference.Address equal to unique endpoint reference of the DUT
    • Types list
    • Scopes list
    • XAddrs list := xaddrsList
    • MetadataVersion

13.2. If xaddrsList contains URI address with not a LinkLocal IPv4 address from ONVIF Client subnet, go to step 15.

14. If timeout1 timeout expires for step 5 without Hello with URI address with not a LinkLocal IPv4 address from ONVIF Client subnet, FAIL the test and skip other steps.

15. ONVIF client waits for 5 seconds after Hello was received.

16. ONVIF Client invokes GetUsers without any authentication.

17. The DUT responds with HTTP 401 Unauthorized error.
18. ONVIF Client invokes GetUsers with user with the user level Administrator credentials.

19. The DUT responds with a GetUsersResponse message with parameters
   - UserList

**Test Result:**

**PASS** –
   - The DUT passed all assertions.

**FAIL** –
   - The DUT did not send GetUsersResponse message.
   - The DUT allowed Anonymous access to the GetUsers command.
   - The DUT did not send StartFirmwareUpgradeResponse message.
   - The DUT did not response with HTTP 200 OK to HTTP POST request.
   - The DUT did not send Bye message with EndpointReference.Address equal to unique endpoint reference of the DUT in case Bye message was supported by the DUT.
   - The DUT did not send GetSystemDateAndTimeResponse message.

**Note:** Reboot Timeout will be used for waiting for the Bye message from the DUT. Reboot Timeout will be taken from the Reboot Timeout field of ONVIF Device Test Tool.

**Note:** timeout1 will be selected as maximum of (downTimeDuration, Reboot Timeout), where Reboot Timeout will be taken from the Reboot Timeout field of ONVIF Device Test Tool.

**Note:** IPv4 address from Hello shall be used for further test cases.

### 5.3.2 Invalid Firmware Upload

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

**Specification Coverage:** Firmware Upload via HTTP

**Feature Under Test:** StartFirmwareUpgrade

**WSDL Reference:** devicemgmt.wsdl

**Test Purpose:** To verify that the firmware upgrade fails with the expected error code.

**Pre-Requisite:** GetServices command is supported by the DUT. HttpFirmwareUpgradefeature is supported by the DUT as indicated by the System.HttpFirmwareUpgrade.
Test Configuration: ONVIF Client and DUT

Test Sequence:

1. Start an ONVIF Client.
2. Start the DUT.
3. ONVIF Client invokes StartFirmwareUpgrade.
4. The DUT responds with a StartFirmwareUpgradeResponse message with parameters
   - UploadUri =: uploadUri
   - UploadDelay =: duration
   - ExpectedDownTime
5. ONVIF Client waits for time duration
6. ONVIF Client invokes HTTP POST to uploadUri with parameters
   - HTTP Header [Content-Type] := "application/octet-stream"
   - HTTP Body := invalid firmware file
7. The DUT responds with HTTP 415 message.
8. ONVIF client waits Reboot timeout.
9. ONVIF Client sends Probe message and if DUT does not respond with ProbeMatch message then go to the step 10. If DUT responds, then finish the test.
10. ONVIF Client waits for Hello message sent from newly configured address by the DUT. Then ONVIF Client starts using this newly configured address for further communications with DUT.

Test Result:

PASS –
- The DUT passed all assertions.

FAIL –
- The DUT did not send StartFirmwareUpgradeResponse message.
- The DUT did not response with HTTP 415 to HTTP POST request.
Annex A Helper Procedures and Additional Notes

This section describes the meaning of the following definitions. These definitions are used in the test case description.

A.1 Create user with defined user level

Name: HelperCreateUserLevel

Procedure Purpose: Helper procedure to create user with predefined user level or change existing with new one.

Pre-requisite: GetServices command is supported by the DUT. Maximum Username Length is supported by the DUT as indicated by the Capabilities.Security.MaxUserNameLength, Maximum Password Length is supported by the DUT as indicated by the Capabilities.Security.MaxPasswordLength.

Input: The user level (userLevel) of user to be created (userLevel shall have User or Operator value).

Returns: The user login (userLogin) with predefined user level and corresponding user password (password).

Procedure:

1. ONVIF Client gets the service capabilities (out cap) by following the procedure mentioned in Annex A.2.

2. If cap does not contain Security.MaxPasswordLength or Security.MaxUserNameLength, FAIL the test and skip other steps.

3. ONVIF Client invokes GetUsers.

4. The DUT responds with a GetUsersResponse message with parameters

   • User list := userList

5. If there is user with user level userLevel in userList:

   5.1. Set the following:

       • passwordLength := cap.Security.MaxPasswordLength
       • userLogin := Username of user with user level equal to userLevel from userList
       • password := random string, contains passwordLength ASCII characters
5.2. ONVIF Client invokes **SetUser** with parameters

- User[0].Username := *userLogin*
- User[0].Password := *password*
- User[0].UserLevel := *userLevel*
- Extension skipped

5.3. If the DUT responds with **SetUserResponse** message, skip other steps.

5.4. If the DUT returns env:Sender\ter:OperationProhibited\ter:Password SOAP 1.2 fault:

5.4.1. Set the following:

- *password* := random string, contains *passwordLength* ASCII characters

5.4.2. Go to the step 6.2.

5.5. If DUT returns other SOAP 1.2 fault, FAIL the test and skip other steps.

6. If there are no users with user level *userLevel* in *userList*:

6.1. Set the following:

- *userLoginLength* := *cap.Security.MaxUserNameLength*
- *userLogin* := random string, contains *userLoginLength* low case alphabet characters, differs from usernames listed in *userList*
- *password* := random string, contains *passwordLength* ASCII characters

6.2. ONVIF Client invokes **CreateUsers** with parameters

- User[0].Username := *userLogin*
- User[0].Password := *password*
- User[0].UserLevel := *userLevel*
- Extension skipped

6.3. If the DUT responds with **CreateUsersResponse** message, skip other steps.

6.4. If the DUT returns env:Sender\ter:OperationProhibited\ter:Password SOAP 1.2 fault:
6.4.1. Set the following:
   • \textit{password} := random string, contains \textit{passwordLength} ASCII characters

6.4.2. Go to the step 7.2.

6.4.3. If the DUT returns other SOAP 1.2 fault, FAIL the test and skip other steps.

\textbf{Procedure Result:}

\textbf{PASS} –
   • The DUT passed all assertions.

\textbf{FAIL} –
   • The DUT did not send \texttt{GetServiceCapabilitiesResponse} message.
   • The DUT did not send \texttt{GetUsersResponse} message.

\textbf{Note:} ONVIF client uses password values from Management tab for CreateUsers and StUser operations if 'Provide own passwords' is active on Management tab.

\textbf{A.2  Get service capabilities}

\textbf{Name:} HelperGetServiceCapabilities

\textbf{Procedure Purpose:} Helper procedure to get device service capabilities.

\textbf{Pre-requisite:} None.

\textbf{Input:} None.

\textbf{Returns:} The service capabilities (\textit{cap}).

\textbf{Procedure:}

1. ONVIF Client invokes \texttt{GetServiceCapabilities}.
2. The DUT responds with a \texttt{GetServiceCapabilitiesResponse} message with parameters
   • Capabilities := \textit{cap}

\textbf{Procedure Result:}

\textbf{PASS} –
   • The DUT passed all assertions.
FAIL –

• The DUT did not send `GetServiceCapabilitiesResponse` message.

A.3 Time synchronization

Name: `HelperTimeSynchronization`

Procedure Purpose: Helper procedure for time synchronization between ONVIF Client and DUT after hard system factory default.

Pre-requisite: None.

Input: None.

Returns: None.

Procedure:

1. ONVIF Client invokes `SetNTP` without any authentication with parameters
   • `FromDHCP := true`
   • `NTPManual` skipped

2. The DUT responds with a `SetNTPResponse` message.

3. ONVIF client invokes `GetSystemDateAndTime` without any authentication.

4. The DUT responds with `GetSystemDateAndTimeResponse` message with parameters
   • `SystemDateAndTime := dateAndTimeSettings`

5. ONVIF Client invokes `SetSystemDateAndTime` without any authentication with parameters
   • `DateTimeType := NTP`
   • `DaylightSavings := dateAndTimeSettings.DaylightSavings`
   • `TimeZone := dateAndTimeSettings.TimeZone`
   • `UTCDatetime` skipped

6. The DUT responds with a `SetSystemDateAndTime` message.

Procedure Result:

PASS –
• The DUT passed all assertions.

FAIL –

• The DUT did not allow Anonymous access to the SetNTP command.
• The DUT did not send SetNTPResponse message.
• The DUT did not allow Anonymous access to the GetSystemDateAndTime command.
• The DUT did not send GetSystemDateAndTimeResponse message.
• The DUT did not allow Anonymous access to the SetSystemDateAndTime command.
• The DUT did not send SetSystemDateAndTimeResponse message.