oneM2M Interoperability Test Procedure

Test Procedure (TP)

- **Revision:** V1.0
- **Issued:** 2017-Feb-09
- **Group Prepared by:** TTA

Abstract:

This document describes interoperability test procedure of oneM2M.

TTA Proprietary & Confidential

Revision History

Revision Number	Date	Comments
V0.5	2016-Oct-02	Initial draft
V0.6	2016-Oct-01	AT4wireless's comment updated
V0.7	2016-Oct-31	TTA member comment updated
V0.8	2016-Nov-16	TTA member comment updated
V0.9	2016-Nov-17	TTA member review
V0.9_r01	2016-Nov-18	Prepare for publication
V0.9_r02	2017-Feb-02	Apply AT4Wireless comments and minor changes
V1.0	2017-Feb-08	Prepare for publication

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Contents

1 Scope

- This document specifies the interoperability test cases to check the compliance of oneM2M product according to oneM2M TS-0001[1], TS-0004[2], oneM2M binding protocols TS-0008[3], TS-0009[4] and TS-0010[5]
- The purpose of oneM2M interoperability testing is for checking the end-to-end functionality in accordance with oneM2M binding protocols (HTTP, CoAP and MQTT) and serializations (XML and JSON).

2 Normative References, Definitions, and Abbreviations

2.1 References

[1] oneM2M TS-0001: "Functional Architecture" V1.14.0.

[2] oneM2M TS-0004: "Service Layer Core Protocol Specification" V1.10.0. [TS-0004-XSD_1.10.0.zip]

[3] oneM2M TS-0008: "CoAP Protocol Binding" V1.5.0.

[4] oneM2M TS-0009: "HTTP Protocol Binding" V1.8.0.

[5] oneM2M TS-0010: "MQTT Protocol Binding" V1.6.0.

[6] oneM2M TS-0013: "Interoperability Testing" V1.3.0.

[7] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax"

[8] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing"

2.2 Definitions

For the purpose of this document, the following definitions apply:

- hosting CSE: CSE where the addressed resource is hosted
- receiver CSE: any CSE that receives a request
- registree: AE or CSE that registers with another CSE
- registrar CSE: CSE where an application or another CSE has registered
- resource: uniquely addressable entity in oneM2M architecture

2.3 Abbreviations

For the purpose of this document, the following abbreviations apply:

- ACP Access Control Policy
- AE Application Entity
- AE-ID Application Entity Identifier
- BBF BroadBand Forum
- CoAP Constrained Application Protocol
- CSE Common Services Entity
- CSE-ID Common Service Entity Identifier
- FQDN Fully Qualified Domain Name
- HTTP HyperText Transfer Protocol
- IN Infrastructure Node
- IN-CSE CSE which resides in the Infrastructure Node
- IUT Implementation Under Test

- JSON JavaScript Object Notation
- M2M Machine to Machine
- Mca Reference Point for M2M Communication with AE
- Mcc Reference Point for M2M Communication with CSE
- MQTT Message Queuing Telemetry Transport
- SP Service Provider
- URI Uniform Resource Identifier
- XML eXtensible Markup Language

3 Test Prerequisite

In order to ease test setup and execution, the CSE and AE are requested to support the following settings:

- Security shall be disabled as it is out of scope of this interoperability testing.
- Resource names are pre-provisioned, except for <contentInstance> resources that are automatically assigned by the hosting CSE.
- After each "Delete" primitive on a resource, the user shall check the resource is effectively deleted.
- Unless it is indicated in the test cases prerequisites, by default, all the applications shall have the required access rights to manage resources on the CSE.
- Serialized Representation: refers to either an XML or a JSON representation of data in text-string format as defined in TS-0004 [2].
- Host Address: refers to the authority part of a target URI as defined in RFC 3986 [7] and RFC 7230 [8] which can be represented as an IP literal encapsulated within square brackets, an IPv4 address in dotted decimal form, or a registered name, and optionally extended by a port identifier.

3.1 Test Configuration

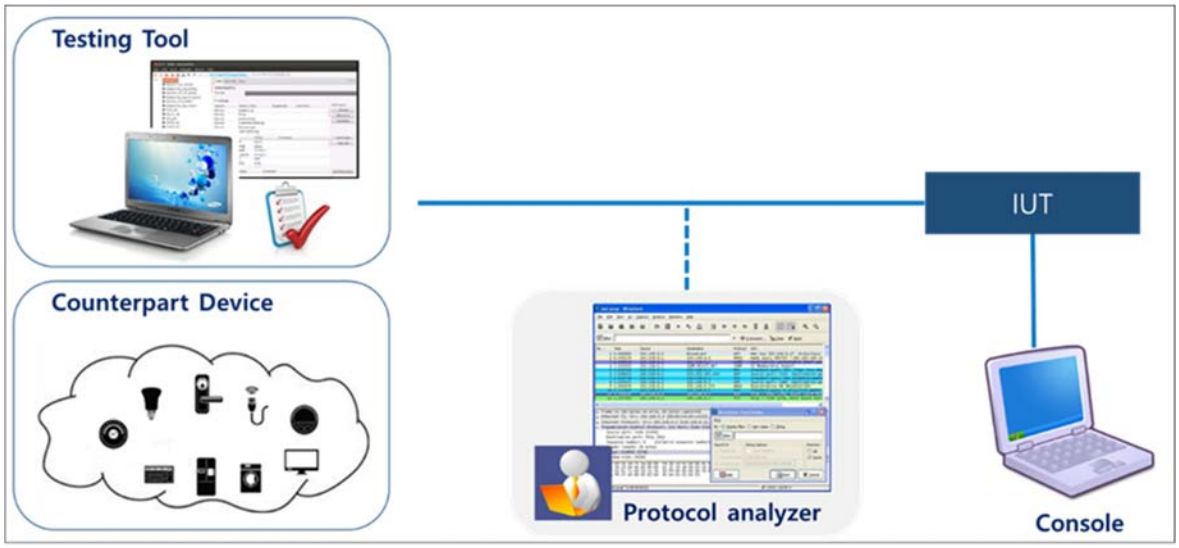

Figure 1. Test Environment of oneM2M interoperability testing

3.1.1 oneM2M_CFG_01 (No Hop)

1) IUT: MN-CSE or IN-CSE

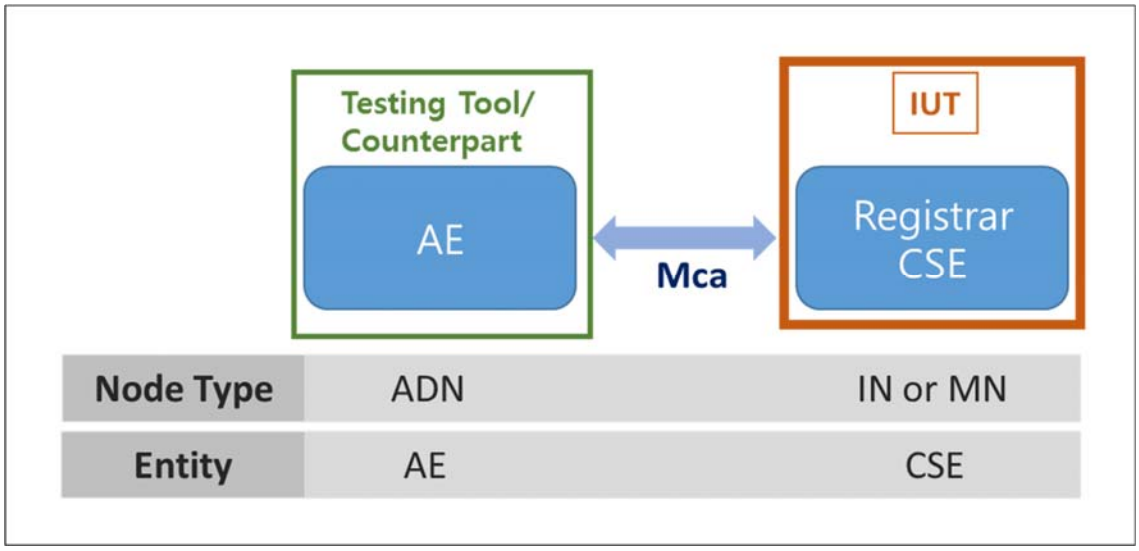

Figure 2. Test Configuration for MN-CSE or IN-CSE

2) IUT: ADN-AE

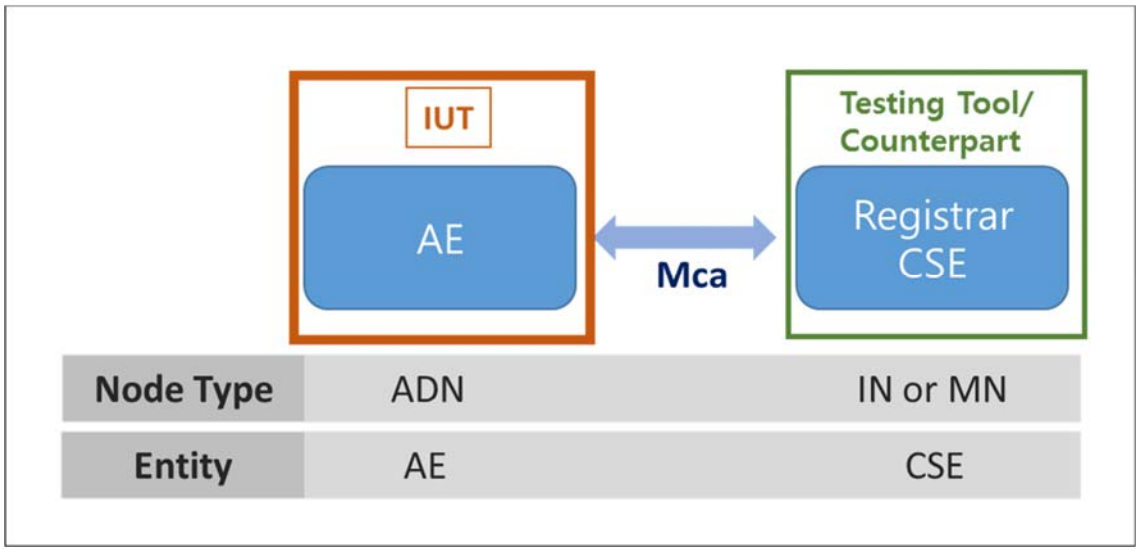

Figure 3. Test Configuration for ADN-AE

3.1.2 oneM2M_CFG_02 (No Hop)

1) IUT: IN-CSE

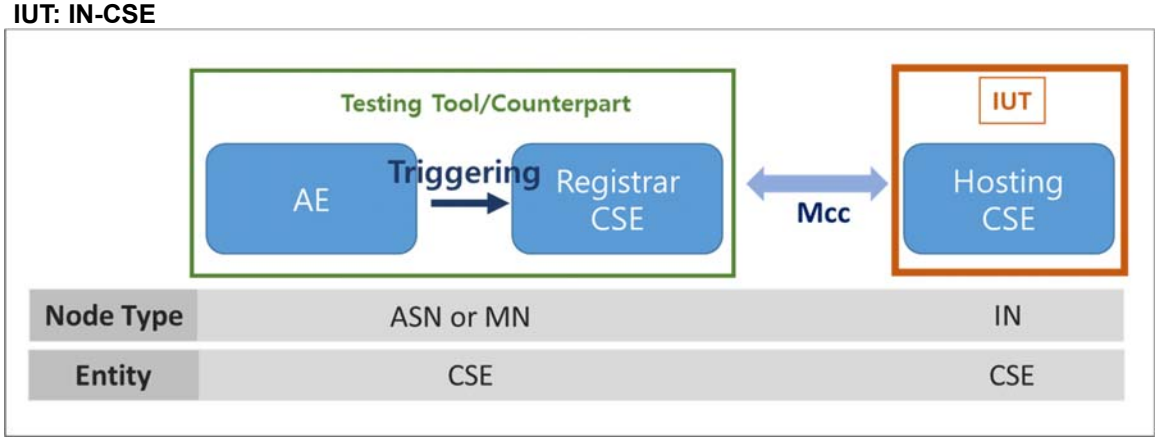

Figure 4. Test Configuration for IN-CSE

2) IUT: ASN-CSE or MN-CSE

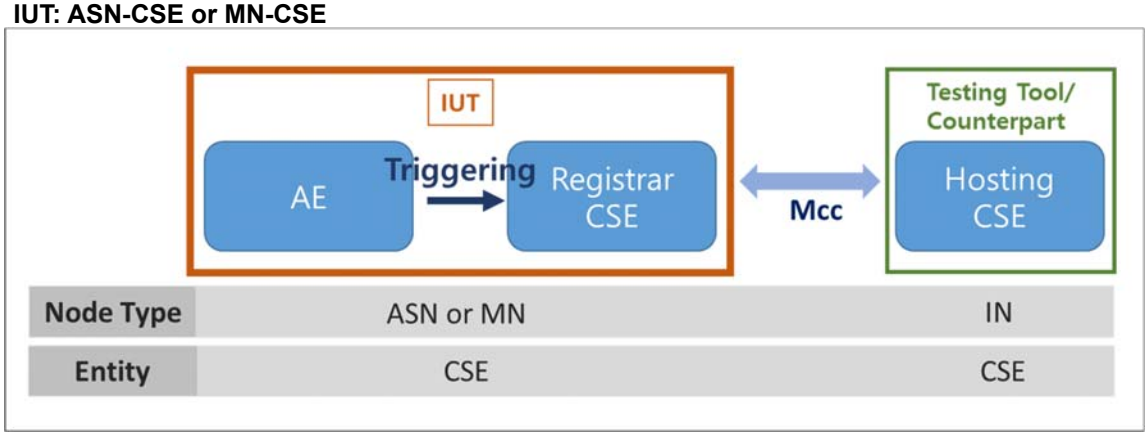

Figure 5. Test Configuration for ASN-CSE or MN-CSE

3.1.3 oneM2M_CFG_03 (Single Hop)

1) IUT: IN-CSE

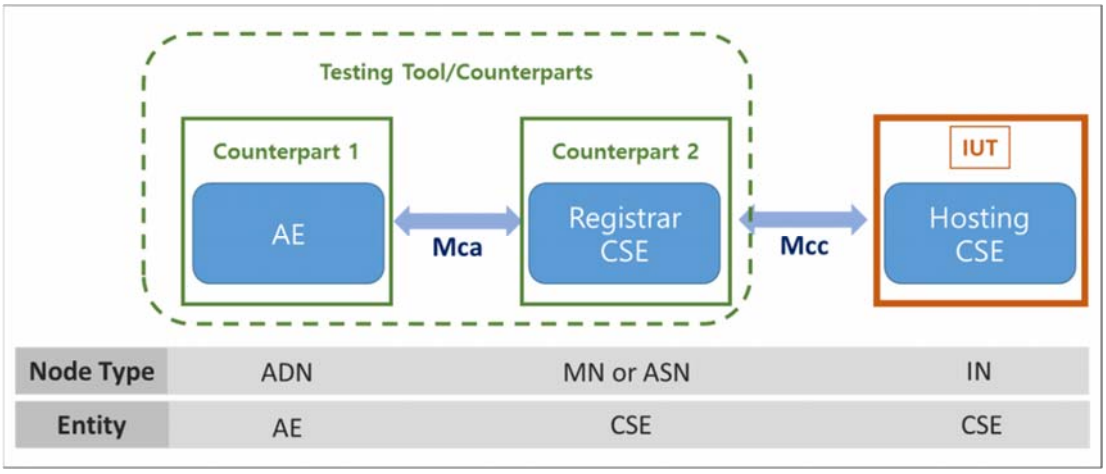

Figure 6. Test Configuration for IN-CSE

2) IUT: ASN-CSE or MN-CSE

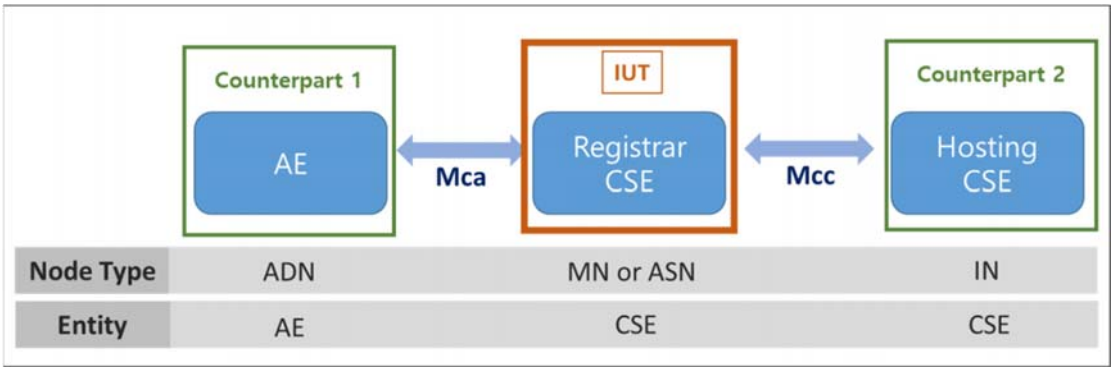

Figure 7. Test Configuration for IN-CSE

3) IUT: ADN-AE

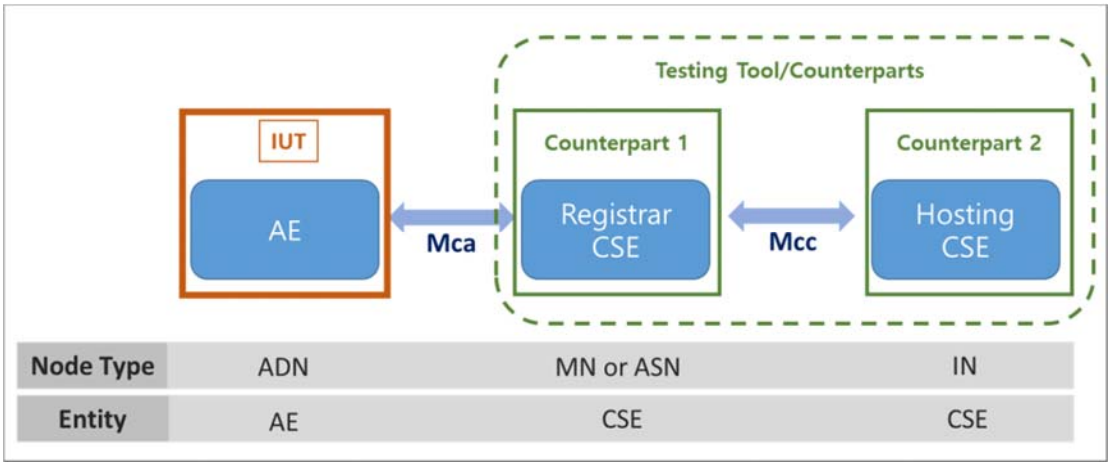

Figure 8. Test Configuration for ADN-AE

4 Summary of All Test Cases

4.1 <CSEBase> Resource Test

Test Case	Summary
oneM2M_CSEBase_BV_01	Verify the **Retrieve** request and response operation of <CSEBase> resource.

4.2 <remoteCSE> Resource Test

Test Case	Summary
oneM2M_remoteCSE_BV_01	Verify the **Create** request and response operation of <remoteCSE> resource between Registree CSE and Registrar CSE.
oneM2M_remoteCSE_BV_02	Verify the **Retrieve** request and response operation of <remoteCSE> resource between Registree CSE and Registrar CSE.
oneM2M_remoteCSE_BV_03	Verify the **Update** request and response operation of <remoteCSE> resource between Registree CSE and Registrar CSE.
oneM2M_remoteCSE_BV_04	Verify the **Delete** request and response operation of <remoteCSE> resource between Registree CSE and Registrar CSE.

4.3 <AE> Resource Test

Test Case	Summary
oneM2M_AE_BV_01	Verify the **Create** request and response operation of <AE> resource between AE and Registrar CSE.
oneM2M_AE_BV_02	Verify the **Retrieve** request and response operation of <AE> resource between AE and Registrar CSE.
oneM2M_AE_BV_03	Verify the **Update** request and response operation of <AE> resource between AE and Registrar CSE.
oneM2M_AE_BV_04	Verify the **Delete** request and response operation of <AE> resource between AE and Registrar CSE.

4.4 <container> Resource Test

Test Case	Summary
oneM2M_container_BV_01	Verify the **Create** request and response operation of <container> resource between AE and Registrar CSE.

oneM2M_container_BV_02	Verify the **Retrieve** request and response operation of <container> resource between AE and Registrar CSE.
oneM2M_container_BV_03	Verify the **Update** request and response operation of <container> resource between AE and Registrar CSE.
oneM2M_container_BV_04	Verify the **Delete** request and response operation of <container> resource between AE and Registrar CSE.

4.5 <contentInstance> Resource Test

Test Case	Summary
oneM2M_contentInstance_BV_01	Verify the **Create** request and response operation of <contentInstance> resource between AE and Registrar CSE.
oneM2M_contentInstance_BV_02	Verify the **Retrieve** request and response operation of <contentInstance> resource between AE and Registrar CSE.
oneM2M_contentInstance_BV_03	Verify the **Delete** request and response operation of <contentInstance> resource between AE and Registrar CSE.

4.6 <latest> Resource Test

Test Case	Summary
oneM2M_latest_BV_01	Verify the **Retrieve** request and response operation of <latest> resource between AE and Registrar CSE.
oneM2M_latest_BV_02	Verify the **Delete** request and response operation of <latest> resource between AE and Registrar CSE.

4.7 <oldest> Resource Test

Test Case	Summary
oneM2M_oldest_BV_01	Verify the **Retrieve** request and response operation of <oldest> resource between AE and Registrar CSE.
oneM2M_oldest_BV_02	Verify the **Delete** request and response operation of <oldest> resource between AE and Registrar CSE.

4.8 <subscription> Resource Test

Test Case	Summary
oneM2M_subscription_BV_01	Verify the **Create** request and response operation of <subscription> resource between AE and Registrar CSE.
oneM2M_subscription_BV_02	Verify the **Retrieve** request and response operation of <subscription> resource between AE and Registrar CSE.
oneM2M_subscription_BV_03	Verify the **Update** request and response operation of <subscription> resource between AE and Registrar CSE.
oneM2M_subscription_BV_04	Verify the **Delete** request and response operation of <subscription> resource between AE and Registrar CSE.

4.9 Notification Test

Test Case	Summary
oneM2M_Notification_BV_01	Verify the **Notification** message and operation between Hosting CSE and AE.

4.10 <accessControlPolicy> Resource Test

Test Case	Summary
oneM2M_accessControlPolicy_BV_01	Verify the **Create** request and response operation of <accessControlPolicy> resource between AE and Registrar CSE.
oneM2M_accessControlPolicy_BV_02	Verify the **Retrieve** request and response operation of <accessControlPolicy> resource between AE and Registrar CSE.
oneM2M_accessControlPolicy_BV_03	Verify the **Update** request and response operation of <accessControlPolicy> resource between AE and Registrar CSE.
oneM2M_accessControlPolicy_BV_04	Verify the **Delete** request and response operation of <accessControlPolicy> resource between AE and Registrar CSE.

4.11 Access Control Test

Test Case	Summary
oneM2M_AccessControl_BV_01	Verify the response message when authorized AE require allowed accessControlOperation to the resource.(**Success**)
oneM2M_AccessControl_BI_02	Verify the response message when unauthorized AE require accessControlOperation to the resource.(**Access_Denied**)
oneM2M_AccessControl_BI_03	Verify the response message when authorized AE require not allowed accessControlOperation to the resource.(**Access_Denied**)

4.12 Discovery Test

Test Case	Summary
oneM2M_Discovery_BV_01	Verify the search request and response operation of finding **all accessible resources** between AE and Registrar CSE.
oneM2M_Discovery_BV_02	Verify the search request and response operation by **Label Filter Criteria** between AE and Registrar CSE.
oneM2M_Discovery_BV_03	Verify the search request and response operation by **Limit Filter Criteria** between AE and Registrar CSE.
oneM2M_Discovery_BV_04	Verify search request and response operation by **Multiple Filter Criteria** between AE and Registrar CSE.

4.13 <node> Resource Test

Test Case	Summary
oneM2M_node_BV_01	Verify the **Create** request and response operation of <node> resource between AE and Registrar CSE.
oneM2M_node_BV_02	Verify the **Retrieve** request and response operation of <node> resource between AE and Registrar CSE.
oneM2M_node_BV_03	Verify the **Update** request and response operation of <node> resource between AE and Registrar CSE.
oneM2M_node_BV_04	Verify the **Delete** request and response operation of <node> resource between AE and Registrar CSE.

4.14 <mgmtCmd> Resource Test

Test Case	Summary
oneM2M_mgmtCmd_BV_01	Verify the **Create** request and response operation of <mgmtCmd> resource between AE and Registrar CSE.
oneM2M_ mgmtCmd_BV_02	Verify the **Retrieve** request and response operation of <mgmtCmd> resource between AE and Registrar CSE.
oneM2M_ mgmtCmd_BV_03	Verify the **Update** request and response operation of <mgmtCmd> resource between AE and Registrar CSE.
oneM2M_ mgmtCmd_BV_04	Verify the **Delete** request and response operation of <mgmtCmd> resource between AE and Registrar CSE.
oneM2M_ mgmtCmd_BV_05	Verify the **Triggering** request and response operation of <mgmtCmd> resource between AE and Registrar CSE.

4.15 <execInstance> Resource Test

Test Case	Summary
oneM2M_execInstance_BV_01	Verify the **Retrieve** request and response operation of <execInstance> resource between AE and Registrar CSE.
oneM2M_execInstance_BV_02	Verify the **Update** request and response operation of <execInstance> resource between AE and Registrar CSE.
oneM2M_execInstance_BV_03	Verify the **Delete** request and response operation of <execInstance> resource between AE and Registrar CSE.

5 Test Purposes (TP)

5.1 TP Naming Conventions

Table 1: TP Naming Convention

<root>/<gr>/<subgr>/<nn>		
<root> = root	oneM2M	oneM2M
<gr> = resource or function	<resource> or function	Name of <resource> or function
<subgr> = behavior	behavior	BV:Behavior Valid
		BI: Behavior Invalid
<nn> = sequential number		01 to 99

5.2 TP Definition Conventions

- Test Case Identifier: A unique test case identifier
- Test Purpose: A concise summary and purpose of the test case
- Test configuration: All required equipment for the test case
- Applicability: A list of applicable IUT to execute the test case
  - ADN (Application Dedicated Node): An ADN is a Node that contains one AE (Application Entity) and does not contain a CSE (Common Service Entity).
  - ASN (Application Service Node): An ASN is a Node that contains one CSE and contains at least one AE.
  - MN (Middle Node): An MN is a Node that contains one CSE and contains zero and more AEs.
  - IN (Infrastructure Node): An IN is a Node that contains one CSE and contains zero and more AEs.
- Initial Condition: A list of test specific pre-conditions that need to be met by the IUT including information about equipment configuration
- Test procedure: An ordered list of equipment operation and observations
- Pass/Fail Criteria: the criteria in order to verify the appropriate sequence and contents of protocol messages

5.3 General Test Condition

- **'To' parameter** can be presented by three formats as follows, and the addressing methodology is based on hierarchical addressing in this document.
  - **CSE-relative format; or,**
  - **SP-relative format; or,**
  - **Absolute format**

  Additionally, when IUT supports CSE, it shall support the addressing methodology as both hierarchical and non-hierarchical addressing.

- After each 'Delete' primitive on a resource, it shall check that the corresponding resource is effectively deleted.

- For the HTTP binding protocol, Content-Type of the HTTP response should be chosen by the Hosting CSE considering the Accept header given in the HTTP request.

5.4 <CSEBase> Resource Test

5.4.1 oneM2M_CSEBase_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <CSEBase> resource in Registrar CSE.
- CSE: Verify that CSE can properly respond containing the serialized representation of <CSEBase> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to create <CSEBase> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2(Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID of request originator
- rqi = (token-string)

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}
- Host: Host Address of registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Payload: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: Registrar CSE host
- Uri-Port: Registrar CSE port
- Uri-Path: {CSE-ID}/{CSEBase}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x

ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2
- to = {CSE-ID}/{CSEBase}
- fr = AE-ID
- rqi = value of rqi primitive parameter

3) Registrar CSE shall send 'Retrieve Response' message to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = Same string as received in request message
- pc = Serialized Representation of <CSEBase> resource

<<HTTP>>

- Status Code = 200
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Payload: Serialized Representation of <CSEBase> resource

<<CoAP>>

- Response Code = 2.05
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-RQI: value of rqi primitive parameter
- oneM2M-RSC: 2000
- Payload: Serialized Representation of <CSEBase> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rqi = value of rqi primitive parameter

- rsc = 2000
- pc = Serialized Representation of <CSEBase> resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- ■ In Step 2, IUT shall send the request message in proper format.
- ■ In Step 4, IUT shall work properly according to the status code in received response message from CSE.

○ When IUT supports CSE,
- ■ In Step 2, IUT shall work properly according to the request message from AE.
- ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body. (Check that IUT shall support corresponding resource types according to the value in 'srt' attribute.)

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
1)cst	cseType	m2m:cseTypeID
csi	CSE-ID	m2m:ID
srt	supportedResourceType	list of m2m:resourceType
poa	pointOfAccess	m2m:poaList

1) In case of IN-CSE, 'cst' is mandatory attribute.

5.5 <remoteCSE> Resource Test

5.5.1 oneM2M_remoteCSE_BV_01

□ Test purpose

- Registree CSE: Verify that Registree CSE can send the Request message to create <remote CSE> resource.
- Registrar CSE: Verify that Registrar CSE can work properly and respond the message containing the serialized representation of created <remoteCSE> resource.

□ Test configuration

- oneM2M_CFG_02

□ Applicability

- Node-ASN,MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.

□ Test procedure

1) Registree CSE sends a 'Create Request' message to create < remoteCSE > resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = Registree CSE-ID
- rqi = (token-string)
- ty = 16 (remoteCSE)
- pc = Serialized representation of <remoteCSE> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: Registree CSE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=16 or application/vnd.onem2m-res+json; ty=16
- Message-body: Serialized representation of <remoteCSE> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}

- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 16
- oneM2M-FR: Registree CSE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <remoteCSE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1
- to = {CSE-ID}/{CSEBaseName}
- fr = Registree CSE-ID
- rqi = value of rqi primitive parameter
- ty = 16 (remoteCSE)
- pc = Serialized representation of <remoteCSE> resource

3) Registrar CSE shall create <container> resource properly and send a 'Create Response' message to Registree CSE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <remoteCSE> resource

<<HTTP>>

- Status Code = 201 (Created)
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created remoteCSE resource.
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <remoteCSE> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created remoteCSE resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <remoteCSE> resource

<<MQTT>>

- Topic: “/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
- rsc = 2001 (CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <remoteCSE> resource

□ Pass/Fail Criteria

- When IUT supports Registree CSE,
  - In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
cb	CSEBase	xs:anyURI
csi	CSE-ID	m2m:ID
rr	requestReachability	xs:boolean

  - In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.
- When IUT supports Registrar CSE,
  - In Step 2, IUT shall work properly according to the request message from Registree CSE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cb	CSEBase	xs:anyURI
csi	CSE-ID	xs:anyURI
rr	requestReachability	xs:boolean

5.5.2 oneM2M_remoteCSE_BV_02

□ Test purpose

- Registree CSE: Verify that Registree CSE can send the Request message to retrieve <remote

CSE> resource.
- Registrar CSE: Verify that Registrar CSE can work properly and respond the message containing the serialized representation of <remoteCSE> resource.

□ Test configuration
- oneM2M_CFG_02

□ Applicability
- Node-ASN,MN,IN, Entity-CSE

□ Initial Condition
- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <remoteCSE> resource with the name {remoteCSE} has created in the Registrar CSE.

□ Test procedure

1) Registree CSE sends a 'Retrieve Request' message to retrieve < remoteCSE > resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: Registree CSE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: Registree CSE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID>"

- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE shall send the 'Retrieve Response' message containing the serialized representation of <remoteCSE> resource to Registree CSE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <remoteCSE> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <remoteCSE> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <remoteCSE> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2000 (OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <remoteCSE> resource

□ Pass/Fail Criteria

- ○ When IUT supports Registree CSE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.
- ○ When IUT supports Registrar CSE,

- In Step 2, IUT shall work properly according to the request message from Registree CSE.
- In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cb	CSEBase	xs:anyURI
csi	CSE-ID	xs:anyURI
rr	requestReachability	xs:boolean

5.5.3 oneM2M_remoteCSE_BV_03

□ Test purpose

- Registree CSE: Verify that Registree CSE can send the Request message to update <remote CSE> resource.
- Registrar CSE: Verify that Registrar CSE can work properly and respond the message containing the serialized representation of updated <remoteCSE> resource.

□ Test configuration

- oneM2M_CFG_02

□ Applicability

- Node-ASN,MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <remoteCSE> resource with the name {remoteCSE} has created in the Registrar CSE.

□ Test procedure

1) Registree CSE sends an 'Update Request' message to update <remoteCSE> resource in the Registrar CSE.(e.g. 'poa', 'mei', 'tri', or 'rr')
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <remoteCSE> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: Registree CSE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <remoteCSE> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- oneM2M-FR: Registree CSE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <remoteCSE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <remoteCSE> resource

3) Registrar CSE shall update <remoteCSE> resource properly and send an 'Update Response' message to Registree CSE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (UPDATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <remoteCSE> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter

- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <remoteCSE> resource

<<CoAP>>

- Response Code = 2.04 (UPDATED)
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <remoteCSE> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <remoteCSE> resource

□ Pass/Fail Criteria

- When IUT supports Registree CSE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.
- When IUT supports Registrar CSE,
  - In Step 2, IUT shall work properly according to the request message from Registree CSE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their values shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cb	CSEBase	xs:anyURI
csi	CSE-ID	xs:anyURI
rr	requestReachability	xs:boolean

5.5.4 oneM2M_remoteCSE_BV_04

□ Test purpose

- Registree CSE: Verify that Registree CSE can send the Request message to delete <remote CSE> resource.
- Registrar CSE: Verify that Registrar CSE can work properly and respond the message in prop er format.

□ Test configuration

- oneM2M_CFG_02

□ Applicability

- Node-ASN,MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <remoteCSE> resource with the name {remoteCSE} has created in the Registrar CSE.

□ Test procedure

1) Registree CSE sends a 'Delete Request' message to delete <remoteCSE> resource in the R egistrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: Registree CSE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{remoteCSE}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)

- oneM2M-FR: Registree CSE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<Registree CSE-ID>/<Registrar CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{remoteCSE}
- fr = Registree CSE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes < remoteCSE > resource properly and send a 'Delete Response' mes sage to Registree CSE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.01 (OK)
- oneM2M-RSC: 2002
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic: "/oneM2M/resp/<Registree SP-Relative-CSE-ID>/<Registrar SP-Relative-CSE-ID> "
- Payload:
- rsc = 2002
- rqi = value of rqi primitive parameter
- pc = empty or contents could be included.

□ Pass/Fail Criteria

- When IUT supports Registree CSE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.
- When IUT supports Registrar CSE,
  - In Step 2, IUT shall successfully delete <remoteCSE> resource according to the request message from Registree CSE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.6 <AE> Resource Test

5.6.1 oneM2M_AE_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <AE> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <AE> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <AE> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format. AE shall set 'fr' parameter according to the corresponding certain conditi on.

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = [Conditional]
  - M2M-SP-assigned AE-ID-Stem starting with 'S' character
    /* AE-ID is issued by IN-CSE */
  - Registrar CSE-assigned AE-ID-Stem starting with 'C' character
    /* AE-ID is issued by MN-CSE */
  - AE-ID-Stem /* by Hosting CSE */
- rqi = (token-string)
- ty = 2 (AE)
- pc = Serialized representation of <AE> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=2 o r application/vnd.onem2m-res+json; ty=2
- Message-body: Serialized representation of <AE> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Content-Format = 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 2
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <AE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 2 (AE)

3) Registrar CSE shall create <AE> resource properly and send 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <AE> resource

<<HTTP>>

- Status Code = 201
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created AE resource.
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <AE> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created AE resource

- Content-Format = 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <AE> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2001 (CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <AE> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
api	App-ID	xs:string
rr	requestReachability	xs:boolean

■ In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.

■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, 'aei' attribute with the proper value shall be correctly included in the Message-Body according to the 'fr' value of the request message.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
api	App-ID	xs:string
aei	AE-ID	m2m:ID
rr	requestReachability	xs:boolean

5.6.2 oneM2M_AE_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <AE> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <AE> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <AE> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID of request originator
- rqi = (token-string)

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = value of rqi primitive parameter

3) Registrar CSE shall send the 'Retrieve Response' message containing the serialized representation of <AE> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <AE> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <AE> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <AE> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2000 (OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <AE> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
api	App-ID	xs:string
aei	AE-ID	m2m:ID
rr	requestReachability	xs:boolean

5.6.3 oneM2M_AE_BV_03

□ Test purpose

- AE: Verify that AE can send the Request message to update <AE> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of updated <AE> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

□ Test procedure

1) AE sends an 'Update Request' message to update <AE> resource in the Registrar CSE.(e.g. 'et' or 'rr')
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID

- rqi = (token-string)
- pc = Serialized representation of updated <AE> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <AE> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <AE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <AE> resource

3) Registrar CSE shall update <AE> resource properly and send an ‘Update Response’ messa ge to AE.
4) Check the ‘Update Response’ message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2004 (UPDATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <AE> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <AE> resource

<<CoAP>>

- Response Code = 2.04 (UPDATED)
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <AE> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <AE> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their values shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
api	App-ID	xs:string
aei	AE-ID	m2m:ID

rr	requestReachability	xs:boolean

5.6.4 oneM2M_AE_BV_04

□ Test purpose

- AE: Verify that AE can send the Request message to delete <AE> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <AE> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x

ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE shall delete <AE> resource properly and send a 'Delete Response' message t o AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2002
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002
- rqi = value of rqi primitive parameter
- pc = empty or contents could be included.

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete <AE> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.7 <container> Resource Test

5.7.1 oneM2M_container_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <container> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <container> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <container> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = (token-string)
- ty = 3 (container)
- pc = Serialized representation of <container> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=3 o r application/vnd.onem2m-res+json; ty=3
- Message-body: Serialized representation of <container> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE

- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 3
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <container> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 3 (container)
- pc = Serialized representation of <container> resource

3) Registrar CSE shall create <container> resource properly and send a 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <container> resource

<<HTTP>>

- Status Code = 201 (Created)
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created resource.
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <container> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)

- Payload: Serialized representation of <container> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2001 (CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <container> resource

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response message from AE.
- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall work properly according to the request message from AE.
  - ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cni	currentNrOfInstances	xs:nonNegativeInteger
cbs	currentByteSize	xs:nonNegativeInteger

5.7.2 oneM2M_container_BV_02

□ Test purpose

- ○ AE: Verify that AE can send the Request message to retrieve <container> resource.
- ○ CSE: Verify that CSE can work properly and respond the message containing the serialized representation of <container> resource.

□ Test configuration

- ○ oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <container> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = value of rqi primitive parameter

- pc = empty

○ Registrar CSE shall send the 'Retrieve Response' message containing the serialized representation of <container> resource to AE.

3) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <container> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <container> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <container> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <container> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message in proper format.
■ In Step 4, IUT shall work properly according to the status code in received response message from AE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.
■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute	Syntax

Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cni	currentNrOfInstances	xs:nonNegativeInteger
cbs	currentByteSize	xs:nonNegativeInteger

5.7.3 oneM2M_container_BV_03

□ Test purpose

- AE: Verify that AE can send the Request message to update <container> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of updated <container> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Update Request' message to update <container> resource in the Registrar CSE. (e.g. et, mbs, mni attributes)
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <container> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <container> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <container> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - op = 3 (Update)
  - to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
  - fr = AE-ID
  - rqi = value of rqi primitive parameter
  - pc = Serialized representation of updated <container> resource

3) Registrar CSE updates <container> resource properly and send an 'Update Response' message to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (Updated)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <container> resource

<<HTTP>>

- Code = 200 (Ok)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter

- Content-Type: application/vnd.onem2m-res+xml or
  application/vnd.onem2m-res+json
- Message-body: Serialized representation of <container> resource

<<CoAP>>

- Response Code = 2.04
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload : Serialized representation of <container> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of modified <container> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their values shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cni	currentNrOfInstances	xs:nonNegativeInteger
cbs	currentByteSize	xs:nonNegativeInteger

5.7.4 oneM2M_container_BV_04

□ Test purpose

- AE: Verify that AE can send the Request message to delete <container> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <container> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative- AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <container> resource properly and send a 'Delete Response' messag e to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002(DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response messa ge from CSE.
- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall successfully delete <container> resource according to the request mess

age from AE.

- In Step 4, IUT shall successfully respond the message in proper format.

5.8 <contentInstance> Resource Test

5.8.1 oneM2M_contentInstance_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <contentInstance> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <contentInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <contentInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = (token-string)
- ty = 4 (contentInstance)
- pc = Serialized representation of <contentInstance> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=4 or application/vnd.onem2m-res+json; ty=4
- Message-body: Serialized representation of <contentInstance> resource

<<CoAP>>

- Method: 0.02 (POST)

- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 4
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <contentInstance> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 4 (contentInstance)
- pc = Serialized representation of <contentInstance> resource

3) Registrar CSE shall create <contentInstance> resource properly and send a 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <contentInstance> resource

<<HTTP>>

- Status Code = 201 (Created)
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created resource.
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <contentInstance> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem

2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <contentInstance> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2001 (CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <contentInstance> resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- ■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
con	content	xs:anySimpleType

- ■ In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

○ When IUT supports CSE,
- ■ In Step 2, IUT shall work properly according to the request message from AE.
- ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cs	contentSize	xs:nonNegativeInteger
con	content	xs:anySimpleType

5.8.2 oneM2M_contentInstance_BV_02

□ Test purpose

○ AE: Verify that AE can send the Request message to retrieve <contentInstance> resource.

- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <contentInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- <contentInstance> resource with the name {contentInstance} has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <contentInstance> resource in the Regis trar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE shall send the 'Retrieve Response' message containing the serialized represe ntation of <contentInstance> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitiv e and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <contentInstance> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <contentInstance> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <contentInstance> resource

<<MQTT>>

- Topic:"/oneM2M/resp/< AE-ID>/<Registrar CSE-ID>"
- Payload:
- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <contentInstance> resource

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response messa

ge from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cs	contentSize	xs:nonNegativeInteger
con	content	xs:anySimpleType

5.8.3 oneM2M_contentInstance_BV_03

□ Test purpose

- AE: Verify that AE can send the Request message to delete <contentInstance> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- <contentInstance> resource the name {contentInstance} has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <contentInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{contentInstance}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <contentInstance> resource properly and send a 'Delete Response' message to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)

- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002(DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete <contentInstance> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.9 <latest> Resource Test

5.9.1 oneM2M_latest_BV_01

- AE: Verify that AE can send the Request message to retrieve the latest <contentInstance> res ource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of the latest <contentInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- Two or more <contentInstance> resources has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve the latest <contentInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest

- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE shall send the 'Retrieve Response' message containing the serialized representation of most recently created <contentInstance> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of most recently created <contentInstance> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of most recently created <contentInstance> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of most recently created <contentInstance> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of most recently created <contentInstance> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing the serialized representation of the most recently created <contentInstance> resource. It shall contain mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cs	contentSize	xs:nonNegativeInteger
con	content	xs:anySimpleType

5.9.2 oneM2M_latest_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to delete the latest <contentInstance> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- Two or more <contentInstance> resources has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete the latest <contentInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/latest
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes the most recently created <contentInstance> resource properly and sends a 'Delete Response' message to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- Content-Format = 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- to = AE-ID
- fr = Registrar CSE-ID
- rsc = 2002(DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete the most recently created <contentInstance> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.10 <oldest> Resource Test

5.10.1 oneM2M_oldest_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve the oldest <contentInstance> re source.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of the oldest <contentInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- Two or more <contentInstance> resources has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve the oldest <contentInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE

- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of the first created <contentInstance> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of first created <contentInstance> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of first created <contentInstance> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of first created <contentInstance> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of first created <contentInstance> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response messa ge from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing the serialized representati on of the first created <contentInstance> resource. It shall contain mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
st	stateTag	xs:nonNegativeInteger
cs	contentSize	xs:nonNegativeInteger
con	content	xs:anySimpleType

5.10.2 oneM2M_oldest_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to delete the oldest <contentInstance> res ource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

- ○ <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- ○ Two or more <contentInstance> resources has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete the oldest <contentInstance> resource in th e Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - op = 4 (Delete)
  - to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/oldest
  - fr = AE-ID
  - rqi = value of rqi primitive parameter
  - pc = empty

3) Registrar CSE deletes the first created <contentInstance> resource properly and sends a 'D elete Response' message to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive

and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json) if applicable
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002(DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete the first created <contentInstance> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.11 <subscription> Resource Test

5.11.1 oneM2M_subscription_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <subscription> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <subscription> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <subscription> resource in the Registrar CS E.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1(Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = (token-string)
- ty=23(subscription)
- pc=Serialized representation of <subscription> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml;ty=23 or application/vnd.onem2m-res+json; ty=23
- Message-body: Serialized representation of <subscription> resource

<<CoAP>>

- Method: 0.02 (POST)

- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY:23
- oneM2M-FR:AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <subscription> resource

<<MQTT>>

- Topic: "/oneM2M/req/< SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1(Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 23(subscription)
- pc = Serialized representation of <subscription> resource

3) Registrar CSE shall create <subscription> resource properly and send a 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2001(Created)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <subscription> resource

<<HTTP>>

- Status Code = 201
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created <subscription> resource
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <subscription> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001

- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created <subscription> resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <subscription> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2001(CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <subscription> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
nu	notificationURI	list of xs:anyURI

■ In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.

■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
nu	notificationURI	list of xs:anyURI

5.11.2 oneM2M_subscription_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <subscription> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <subscription> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- <subscription> resource with the name {subscription} has created under {container} in the Reg istrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <subscription> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2(Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- fr = AE-ID
- rqi = (token-string)
- pc= empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)

- oneM2M-FR:AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2(Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of <subscription> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <subscription> resource

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <subscription> resource

<<CoAP>>

- Response Code = 2.05(OK)
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <subscription> resource

<<MQTT>>

- Topic “/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:

- rsc = 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <subscription> resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- ■ In Step 2, IUT shall send the request message in proper format.
- ■ In Step 4, IUT shall work properly according to the status code in received response message from AE.

○ When IUT supports CSE,
- ■ In Step 2, IUT shall work properly according to the request message from AE.
- ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
nu	notificationURI	list of xs:anyURI

5.11.3 oneM2M_subscription_BV_03

□ Test purpose

○ AE: Verify that AE can send the Request message to update <subscription> resource.
○ CSE: Verify that CSE can work properly and respond the message containing the serialized representation of updated <subscription> resource.

□ Test configuration

○ oneM2M_CFG_01

□ Applicability

○ Node-ADN, Entity-AE
○ Node-MN,IN, Entity-CSE

□ Initial Condition

○ <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
○ <AE> resource with the name {AE} has created in the Registrar CSE.

- ○ <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- ○ <subscription> resource with the name {subscription} has created under {container} in the Registrar CSE.

□ Test procedure

1) AE sends an 'Update Request' message to update <subscription> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3(Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- fr = AE-ID
- rqi = (token-string)
- pc= Serialized representation of updated <subscription> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <subscription> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <subscription> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - op = 3(Update)
  - to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
  - fr = AE-ID

- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <subscription> resource

3) Registrar CSE updates <subscription> resource properly and send an 'Update Response' m essage to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2004(UPDATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <subscription> resource

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <subscription> resource

<<CoAP>>

- Response Code = 2.04(UPDATED)
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <subscription> resource

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004(UPDATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <subscription> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response messa

ge from Registrar CSE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their v alues shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
nu	notificationURI	list of xs:anyURI

5.11.4 oneM2M_subscription_BV_04

□ Test purpose

- AE: Verify that AE can send the Request message to delete <subscription> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.
- <subscription> resource with the name {subscription} has created under {container} in the Reg istrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <subscription> resource in the Registrar CS E.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4(Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- fr = AE-ID
- rqi = (token-string)
- pc= empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: “/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
- op = 4(DELETED)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{container}/{subscription}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <subscription> resource properly and send a ‘Delete Response’ message to AE.
4) Check the ‘Delete Response’ message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002(DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02(OK)
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty or contents could be included.

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - rsc = 2002(DELETED)
  - rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall successfully delete <subscription> resource according to the request message from AE.
  - ■ In Step 4, IUT shall successfully respond the message in proper format.

5.12 Notification Test

5.12.1 oneM2M_Notification_BV_01

□ Test purpose

- CSE: Verify that CSE can work properly and send the Notification message to AE2 when trigg ered by AE1.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-MN, IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- AE1 created an <AE> resource in the Registrar CSE using the name {AE1}.
- AE2 created an <AE> resource in the Registrar CSE using the name {AE2}.
- AE2 created an <subscription> resource in the Registrar CSE using the name {subscription} u nder the {AE2} with notificationURI(nu) value as the URI of AE2.

□ Test procedure

1) AE1 sends an 'Update Request' message to update <AE> resource of {AE2} in the Registrar CSE (e.g. 'et'). After receiving request message from AE1, the Registrar CSE sends a notific ation message to AE2.
2) Check the notification message whether it contains corresponding oneM2M Primitive and Bin ding Protocol format as follows:

<<oneM2M Primitive>>

- op = 5(Notify)
- to = notificationURI of subscription resource
- fr = Registrar CSE-ID
- rqi = (token-string)
- pc= Serialized representation of Notification data object

<<HTTP>>

- Request method = POST
- Request-Target: notificationURI of subscription resource
- Host: IP address or the FQDN of notificationURI
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: Registrar CSE-ID
- Content-Type: application/vnd.onem2m-ntfy+xml; or application/vnd.onem2m-ntfy+json;
- Message-body: Serialized representation of Notification data object

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: notificationURI host
- Uri-Port: notificationURI port
- Uri-Path: notificationURI of subscription resource

- oneM2M-FR: Registrar CSE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 10002 (application/vnd.onem2m-ntfy+xml) or 10003 (application/vnd.onem2m-ntfy+json)
- Payload: Serialized representation of Notification data object

<<MQTT>>

- Topic: "/oneM2M/req/<Registrar SP-Relative-CSE-ID>/< SP-Relative-AE-ID>"
- Payload:
- op = 5 (Notify)
- to = notificationURI of subscription resource
- fr = Registrar CSE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of Notification data object

3) AE2 sends a 'Notification Response' message to Registrar CSE.
4) Check the 'Notification Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter

<<CoAP>>

- Response Code = 2.05(OK)
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter

<<MQTT>>

- Topic: "/oneM2M/resp/<Registrar SP-Relative-CSE-ID>/<SP-Relative-AE-ID>"
- Payload:
- rsc = 2000(OK)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports CSE,
  - In Step 2, IUT shall send the Notification message to the corresponding AE.
  - In Step 4, IUT shall work properly according to the status code in received response message from the corresponding AE. Especially, updated attributes and their values of <AE> resource shall be correctly included in the Notification data object.

5.13 <accessControlPolicy> Resource Test

5.13.1 oneM2M_accessControlPolicy_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <accessControlPolicy> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <accessControlPolicy> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <accessControlPolicy> resource in the Regi strar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1(Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID of request originator
- rqi = (token-string)
- ty=1(accessControlPolicy)
- pc=Serialized representation of <accessControlPolicy> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml;ty=1 or application/vnd.onem2m-res+json; ty=1
- Message-body: Serialized representation of accessControlPolicy> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE

- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 1
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <accessControlPolicy> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1(Create)
- to = {CSE-ID}/{CSEBaseName}/{AE}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 1(accessControlPolicy)
- pc = Serialized representation of <accessControlPolicy> resource

3) Registrar CSE shall create <accessControlPolicy> resource properly and send a 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2001(Created)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <accessControlPolicy> resource

<<HTTP>>

- Status Code = 201
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created <accessControlPolicy> resource
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <accessControlPolicy> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001

- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created <accessControlPolicy> resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <accessControlPolicy> resource

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2001
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <accessControlPolicy> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
pv	Privileges	m2m:setOfAcrs
pvs	selfPrivileges	m2m:setOfAcrs

■ In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.

■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
pv	privileges	m2m:setOfAcrs
pvs	selfPrivileges	m2m:setOfAcrs

5.13.2 oneM2M_accessControlPolicy_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <accessControlPolicy> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <accessControlPolicy> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <accessControlPolicy> resource with the name {accessControlPolicy} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <accessControlPolicy> resource in the R egistrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2(Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- fr = AE-ID
- rqi = (token-string)
- pc= empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE

- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of <accessControlPolicy> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <accessControlPolicy> resource

<<HTTP>>

- Status Code = 200
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <accessControlPolicy> resource

<<CoAP>>

- Response Code = 2.05(OK)
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <accessControlPolicy> resource

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <accessControlPolicy> resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- ■ In Step 2, IUT shall send the request message in proper format.
- ■ In Step 4, IUT shall work properly according to the status code in received response message from AE.

○ When IUT supports CSE,
- ■ In Step 2, IUT shall work properly according to the request message from AE.
- ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
pv	privileges	m2m:setOfAcrs
pvs	selfPrivileges	m2m:setOfAcrs

5.13.3 oneM2M_accessControlPolicy_BV_03

□ Test purpose

○ AE: Verify that AE can send the Request message to update <accessControlPolicy> resource.

○ CSE: Verify that CSE can work properly and respond the message containing the serialized representation of updated <accessControlPolicy> resource.

□ Test configuration

○ oneM2M_CFG_01

□ Applicability

○ Node-ADN, Entity-AE
○ Node-MN,IN, Entity-CSE

□ Initial Condition

- ○ <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- ○ <AE> resource with the name {AE} has created in the Registrar CSE.
- ○ <accessControlPolicy> resource with the name {accessControlPolicy} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends an 'Update Request' message to update <accessControlPolicy> resource in the Registrar CSE.(e.g. 'acor' of 'pvs')
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- fr = AE-ID
- rqi = (token-string)
- pc= Serialized representation of updated <accessControlPolicy> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <accessControlPolicy> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <accessControlPolicy> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- fr = AE-ID
- rqi = value of rqi primitive parameter

- pc = Serialized representation of updated <accessControlPolicy> resource

3) Registrar CSE updates <accessControlPolicy> resource properly and sends an 'Update Response' message to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2004(UPDATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <accessControlPolicy> resource

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of <accessControlPolicy> resource

<<CoAP>>

- Response Code = 2.04(UPDATED)
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <accessControlPolicy> resource

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004(UPDATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <accessControlPolicy> resource

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.

- In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their v alues shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
pv	privileges	m2m:setOfAcrs
pvs	selfPrivileges	m2m:setOfAcrs

5.13.4 oneM2M_accessControlPolicy_BV_04

□ Test purpose

- AE: Verify that AE can send the Request message to delete <accessControlPolicy> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <accessControlPolicy> resource with the name {accessControlPolicy} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <accessControlPolicy> resource in the Regi strar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4(Delete)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}

- fr = AE-ID
- rqi = (token-string)
- pc= empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: “/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
- op = 4 (DELETED)
- to = {CSE-ID}/{CSEBaseName}/{AE}/{accessControlPolicy}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <accessControlPolicy> resource properly and send a ‘Delete Response’ message to AE.
4) Check the ‘Delete Response’ message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2002(DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2002(DELETED)
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02(OK)
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: empty or contents could be included.

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - rsc = 2002(DELETED)
  - rqi = value of rqi primitive parameter
  - pc = empty or contents could be included.

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete <accessControlPolicy> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.14 Access Control Test

5.14.1 oneM2M_AccessControl_BV_01

□ Test purpose

- CSE: Verify that CSE can send the response message properly when authorized AE requests to access with allowed accessControlOperation to the resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- Two <AE> resources with the name {AE1} and {AE2} have created in the Registrar CSE.
- Two <accessControlPolicy> resources with the name {accessControlPolicy1} and {accessControlPolicy2} have created in the Registrar CSE. Additionally, privilege options are set as below.
  - {accessControlPolicy1}: accessControlOriginators: {AE1},
    accessControlOperation: CRD
  - {accessControlPolicy2}: accessControlOriginators: {AE2},
    accessControlOperation:CRD

□ Test procedure

1) AE1 sends a 'Retrieve Request' message with allowed accessControlOperation to retrieve <AE1> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID of {AE1}
- rqi = (token-string)
- pc= empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE1}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE1}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of <AE1> resource to AE1.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <AE> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <AE> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <AE> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - rsc = 2000(OK)
  - rqi = value of rqi primitive parameter
  - pc = Serialized representation of <AE> resource

□ Pass/Fail Criteria

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from authorized AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
api	App-ID	xs:string
aei	AE-ID	m2m:ID
rr	requestReachability	xs:boolean

5.14.2 oneM2M_AccessControl_BI_02

□ Test purpose

- CSE: Verify that CSE can send the 'Access_Denied' response message when an unauthorized AE requests to update the resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- Two <AE> resources with the name {AE1} and {AE2} have created in the Registrar CSE.
- Two <accessControlPolicy> resources with the name {accessControlPolicy1} and {accessControlPolicy2} have created in the Registrar CSE. Additionally, privilege options are set as below.
  - {accessControlPolicy1}: accessControlOriginators: {AE1},
    accessControlOperation: CRD

- {accessControlPolicy2}: accessControlOriginators: {AE2},
  accessControlOperation:CRD

□ Test procedure

1) The unauthorized AE2 sends an 'Update Request' message to update <AE1> resource in th e Registrar CSE.(e.g. 'et' or 'rr')
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 3(Update)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID of{AE2}
- rqi = (token-string)
- pc = Serialized representation of updated <AE> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE1}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID of {AE2}
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or appl ication/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <AE> resource

<<CoAP>>

- Method: 0.03 (Update)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE1}
- oneM2M-FR: AE-ID of {AE2}
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <AE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- op = 3(Update)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID of {AE2}
- rqi = value of rqi primitive parameter

- pc = Serialized representation of updated <AE> resource

3) Registrar CSE sends an 'Update Response' message with "Access Denied" as the response status to AE2.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 4103(ACCESS_DENIED)
- rqi = (token-string) same as received in request message
- pc = empty or contents(Human-readable error message) could be included.

<<HTTP>>

- Status Code = 403(Forbidden)
- X-M2M-RSC: 4103
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents(Human-readable error message) could be included.

<<CoAP>>

- Response Code = 4.03(Forbidden)
- oneM2M-RSC: 4103
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: empty or contents(Human-readable error message) could be included.

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 4103 (ACCESS_DENIED)
- rqi = value of rqi primitive parameter
- pc = empty or contents(Human-readable error message) could be included.

□ Pass/Fail Criteria

- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall indicate the failed operation.
  - ■ In Step 4, IUT shall send the response message with the "Access Denied" to the unauthoriz

ed AE.

5.14.3 oneM2M_AccessControl_BI_03

□ Test purpose

- CSE: Verify that CSE can send the response message with 'Access_Denied' when authorized AE requests to access wth not-allowed accessControlOperation to the resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- Two <AE> resources with the name {AE1} and {AE2} have created in the Registrar CSE.
- Two <accessControlPolicy> resources with the name {accessControlPolicy1} and {accessControlPolicy2} have created in the Registrar CSE. Additionally, privilege options are set as below.
  - {accessControlPolicy1}: accessControlOriginators: {AE1}, accessControlOperation: CRD
  - {accessControlPolicy2}: accessControlOriginators: {AE2}, accessControlOperation:CRD

□ Test procedure

1) AE1 sends the 'Update Request' message with not-allowed accessControlOperation to update <AE1> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3(Update)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID of {AE1}
- rqi = (token-string)
- pc = Serialized representation of updated <AE> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{AE1}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID of{AE1}
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <AE> resource

<<CoAP>>

- Method: 0.03 (Update)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{AE1}
- oneM2M-FR: AE-ID of{AE1}
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <AE> resource

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{AE1}
- fr = AE-ID of{AE1}
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <AE> resource

3) Registrar CSE sends an 'Update Response' message with "Access Denied" as the response status to AE1.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 4103(ACCESS_DENIED)
- rqi = (token-string) same as received in request message
-- pc = empty or contents(Human-readable error message) could be included.

<<HTTP>>

- Status Code = 403(Forbidden)
- X-M2M-RSC: 4103
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents(Human-readable error message) could be included.

<<CoAP>>

- Response Code = 4.03(Forbidden)
- oneM2M-RSC: 4103
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: empty or contents(Human-readable error message) could be included.

<<MQTT>>

- Topic "/oneM2M/resp/<SP-Relative-AE1-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - rsc = 4103 (ACCESS_DENIED)
  - rqi = value of rqi primitive parameter
  - pc = empty or contents(Human-readable error message) could be included.

□ Pass/Fail Criteria

- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall indicate the failed operation.
  - ■ In Step 4, IUT shall send the response message with the "Access Denied" to AE.

5.15 Discovery Test

5.15.1 oneM2M_Discovery_BV_01

□ Test purpose

- AE: Verify that AE can discover all accessible resources residing in the registrar CSE.
- CSE: Verify that CSE can respond all discovered resources.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to discover all accessible resources in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID of request originator
- rqi = (token-string)
- fc = {fu=1}
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}?fu=1
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x

ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Uri-Query: fu=1
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- fc = {fu=1}
- pc = empty

3) Registrar CSE sends a response message to AE including all discovered resources informati on.
4) Check the response message whether it contains corresponding oneM2M Primitive and Bind ing protocol as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of data object containing addresses of all discovered resources

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of data object containing addresses of all discovered resources

<<CoAP>>

- Response Code = 2.05
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created <accessControlPolicy> resource

- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)

- Payload: Serialized representation of data object containing addresses of all discovered resources

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2000

- rqi = value of rqi primitive parameter

- pc = Serialized representation of data object containing addresses of all discovered resources

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing addresses of all discovered resources (CSE-relative format) in proper format with mandatory attributes to AE.

5.15.2 oneM2M_Discovery_BV_02

□ Test purpose

- AE: Verify that AE can discover accessible resources residing in the registrar CSE using 'Label Filter Criteria'.
- CSE: Verify that CSE can respond corresponding discovered resources.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE. It includes the label "key1".

□ Test procedure

1) AE sends a 'Retrieve Request' message with "Label Filter Criteria" to discover resources in t he Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID of request originator
- rqi = (token-string)
- fc = {fu=1,lbl=key1}
- pc=empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}?fu=1&lbl=key1
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Uri-Query: fu=1
- Uri-Query: lbl=key1
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - op = 2 (Retrieve)
  - to = {CSE-ID}/{CSEBaseName}
  - fr = AE-ID
  - rqi = value of rqi primitive parameter
  - fc = {fu=1,lbl=key1}
  - pc = empty

3) Registrar CSE sends a response message to AE containing addresses of corresponding res

ources with label ‘key1’.

4) Check the response message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of data object containing addresses of the <container> resources

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of data object containing addresses of the <container> resources

<<CoAP>>

- Response Code = 2.05
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of data object containing addresses of the <container> resources

<<MQTT>>

- Topic: “/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>“
- Payload:

- rsc = 2000
- rqi = value of rqi primitive parameter
- pc = Serialized representation of data object containing addresses of the <container> resources

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.

- In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing addresses of corresponding resources (CSE-relative format) in proper format with mandatory attributes to AE.

5.15.3 oneM2M_Discovery_BV_03

□ Test purpose

- AE: Verify that AE can discover accessible resources residing in the registrar CSE using 'Limited Filter Criteria (lim=2)'.
- CSE: Verify that CSE can respond corresponding discovered resources.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- Three or more <container> resources with the name {container} have created under {AE} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message with "Limited Filter Criteria (lim=2)" to discover resources in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID of request originator
- rqi = (token-string)
- fc = {fu=1,lim=2}
- pc=empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}?fu=1&lim=2
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter

- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Uri-Query: fu=1
- Uri-Query: lim=2
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2(Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- fc = {fu=1,lim=2}
- pc = empty

3) Registrar CSE sends a response message to AE containing addresses of corresponding resources that are limited by the the value of 'lim=2'
4) Check the response message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of data object containing at most 2 addresses of discovered resources

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json

- Message Body: Serialized representation of data object containing at most 2 addresses of discovered resources

<<CoAP>>

- Response Code = 2.05
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of data object containing at most 2 addresses of discovered resources

<<MQTT>>

- Topic: "/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2000
- rqi = value of rqi primitive parameter
- pc = Serialized representation of data object containing at most 2 addresses of discovered resources

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing addresses of corresponding resources (CSE-relative format) in proper format with mandatory attributes to AE.

5.15.4 oneM2M_Discovery_BV_04

□ Test purpose

- AE: Verify that AE can discover accessible resources residing in the registrar CSE using 'Multiple Filter Criteria (label and limit)'.
- CSE: Verify that CSE can respond corresponding discovered resources.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE

- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <AE> resource with the name {AE} has created in the Registrar CSE.
- <container> resource with the name {container} has created under {AE} in the Registrar CSE. It includes the label "key1".

□ Test procedure

1) AE sends a 'Retrieve Request' message with "Multiple Filter Criteria (label and limit)" to discover resources in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID of request originator
- rqi = (token-string)
- fc = {fu=1,lbl=key1,lim=1}
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}?fu=1&lbl=key1&lim=1
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Uri-Query: fu=1
- Uri-Query: lbl=key1
- Uri-Query: lim=1
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- fc = {fu=1,lbl=key1,lim=1}
- pc = empty

3) Registrar CSE sends a response message to AE containing addresses of resources corresp onding to lbl=key1 & lim=1.
4) Check the response message whether it contains corresponding oneM2M Primitive and Bind ing protocol as follows:

<<oneM2M Primitive>>

- rsc = 2000(OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of data object containing the address of one of the <container> resources

<<HTTP>>

- Status Code = 200(OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message Body: Serialized representation of data object containing the address of one of the <container> resources

<<CoAP>>

- Response Code = 2.05
- oneM2M-RSC: 2000
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of data object containing the address of one of the <container> resources

<<MQTT>>

- Topic: “/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:

- rsc = 2000

- rqi = value of rqi primitive parameter
- pc = Serialized representation of data object containing the address of one of the <container> resources

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.
- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing addresses of corresponding resources (CSE-relative format) in proper format with mandatory attributes to AE.

5.16 <node> Resource Test

5.16.1 oneM2M_node_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <node> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized representation of created <node> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.

□ Test procedure

1) AE sends a ‘Create Request’ message to create <node> resource in the Registrar CSE.

2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = (token-string)
- ty = 14 (node)
- pc = Serialized representation of <node> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{CSEBase-Name}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=14 or application/vnd.onem2m-res+json; ty=14
- Message-body: Serialized representation of <node> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 14
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <node> resource

<<MQTT>>

- Topic:“/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
  - op = 1 (Create)
  - to = {CSE-ID}/{CSEBaseName}
  - fr = AE-ID
  - rqi = value of rqi primitive parameter
  - ty = 14 (node)
  - pc = Serialized representation of <node> resource

3) Registrar CSE shall create <node> resource properly and send a 'Create Response' messag e to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <node> resource

<<HTTP>>

- Status Code = 201 (Created)
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created resource.
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <node> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <node> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2001 (CREATED)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <node> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

○ Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ni	nodeID	m2m:nodeID

■ In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
ni	nodeID	m2m:nodeID

5.16.2 oneM2M_node_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <node> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <node> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <node> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{node}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{node}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{node}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{node}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of <node> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol format as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <container> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <node> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <node> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <node> resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- In Step 2, IUT shall send the request message in proper format.
- In Step 4, IUT shall work properly according to the status code in received response message from AE.

○ When IUT supports CSE,
- In Step 2, IUT shall work properly according to the request message from AE.
- In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
ni	nodeID	m2m:nodeID

5.16.3 oneM2M_node_BV_03

□ Test purpose

○ AE: Verify that AE can send the Request message to update <node> resource.
○ CSE: Verify that CSE can work properly and respond the message containing the serialized representation of updated <node> resource.

□ Test configuration

○ oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.

□ Test procedure

1) AE sends an 'Update Request' message to update <node> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{node}
- fr = AE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <node> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{node}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <node> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{node}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <node> resource

<<MQTT>>

- Topic:"/oneM2M/ req /<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{node}

- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <node> resource

3) Registrar CSE updates <node> resource properly and sends an 'Update Response' messag e to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (Updated)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <node> resource

<<HTTP>>

- Code = 200 (Ok)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <node> resource

<<CoAP>>

- Response Code = 2.04
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload : Serialized representation of < node > resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of modified <node> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response messa ge from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with

the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
ni	nodeID	m2m:nodeID

5.16.4 oneM2M_node_BV_04

□ Test purpose

- AE: Verify that AE can send the Request message to delete <node> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <node> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{node}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{node}

- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{node}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{node}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <node> resource properly and sends a 'Delete Response' message to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002 (DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message in proper format.
  - ■ In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- ○ When IUT supports CSE,
  - ■ In Step 2, IUT shall successfully delete <node> resource according to the request message from AE.
  - ■ In Step 4, IUT shall successfully respond the message in proper format.

5.17 <mgmtCmd> Resource Test

5.17.1 oneM2M_mgmtCmd_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to create <mgmtCmd> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of created <mgmtCmd> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.

□ Test procedure

1) AE sends a 'Create Request' message to create <mgmtCmd> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = (token-string)
- ty = 12 (mgmtCmd)
- pc = Serialized representation of <mgmtCmd> resource

<<HTTP>>

- Request method = POST
- Request-Target: {CSE-ID}/{{CSEBase-Name}
- Host: IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml; ty=12 or application/vnd.onem2m-res+json; ty=12
- Message-body: Serialized representation of <mgmtCmd> resource

<<CoAP>>

- Method: 0.02 (POST)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}

- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-TY: 12
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: Serialized representation of <mgmtCmd> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 1 (Create)
- to = {CSE-ID}/{CSEBaseName}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- ty = 12 (mgmtCmd)
- pc = Serialized representation of <mgmtCmd> resource

3) Registrar CSE creates <mgmtCmd> resource properly and sends a 'Create Response' message to AE.
4) Check the 'Create Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2001 (CREATED)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <mgmtCmd> resource

<<HTTP>>

- Status Code = 201 (Created)
- X-M2M-RSC: 2001
- X-M2M-RI: value of rqi primitive parameter
- Content-Location: URI of the created resource.
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <mgmtCmd> resource

<<CoAP>>

- Response Code = 2.01
- oneM2M-RSC: 2001
- oneM2M-RQI: value of rqi primitive parameter
- Location-Path: URI of the created resource
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <mgmtCmd> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
  - rsc = 2001 (CREATED)
  - rqi = value of rqi primitive parameter
  - pc = Serialized representation of <mgmtCmd> resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
cmt	cmdType	m2m:cmdType
ext	execTarget	m2m:nodeID
exm	execMode	m2m:execModeType

■ In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.

■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cmt	cmdType	m2m:cmdType
exe	execEnable	xs:Boolean
ext	execTarget	m2m:nodeID

5.17.2 oneM2M_mgmtCmd_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <mgmtCmd> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <mgmtCmd> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attrib ute 'execTarget' including {node} resource id.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <mgmtCmd> resource in the Registrar C SE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: “/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the ‘Retrieve Response’ message containing the serialized representation of <mgmtCmd> resource to AE.
4) Check the ‘Retrieve Response’ message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <mgmtCmd> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <mgmtCmd> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <mgmtCmd> resource

<<MQTT>>

- Topic:“/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>”
- Payload:
- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <mgmtCmd> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response messa

ge from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cmt	cmdType	m2m:cmdType
exe	execEnable	xs:Boolean
ext	execTarget	m2m:nodeID

5.17.3 oneM2M_mgmtCmd_BV_03

□ Test purpose

- AE: Verify that AE can send the Request message to update <mgmtCmd> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of updated <mgmtCmd> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attrib ute ‘execTarget’ including {node} resource id.

□ Test procedure

1) AE sends an ‘Update Request’ message to update <mgmtCmd> resource in the Registrar C SE.(e.g. cmdType, execTarget)
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <mgmtCmd> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <mgmtCmd> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <mgmtCmd> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <mgmtCmd> resource

3) Registrar CSE updates <mgmtCmd> resource properly and send an 'Update Response' message to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (Updated)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <mgmtCmd> resource

<<HTTP>>

- Code = 200 (Ok)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of < mgmtCmd > resource

<<CoAP>>

- Response Code = 2.04
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload : Serialized representation of < mgmtCmd > resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of modified < mgmtCmd > resource

□ Pass/Fail Criteria

○ When IUT supports AE,
- ■ In Step 2, IUT shall send the request message in proper format.
- ■ In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.

○ When IUT supports CSE,
- ■ In Step 2, IUT shall work properly according to the request message from AE.
- ■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows. Especially, updated attributes and their values shall be correctly included in the Message-Body.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI

ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cmt	cmdType	m2m:cmdType
exe	execEnable	xs:Boolean
ext	execTarget	m2m:nodeID

5.17.4 oneM2M_mgmtCmd_BV_04

□ Test purpose

- ○ AE: Verify that AE can send the Request message to delete <mgmtCmd> resource.
- ○ CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- ○ oneM2M_CFG_01

□ Applicability

- ○ Node-ADN, Entity-AE
- ○ Node-MN,IN, Entity-CSE

□ Initial Condition

- ○ <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- ○ <node> resource with the name {node} has created in the Registrar CSE.
- ○ <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attribute 'execTarget' including {node} resource id.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <mgmtCmd> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID

- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <mgmtCmd> resource properly and send a 'Delete Response' message to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)

- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002(DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete <mgmtCmd> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.

5.17.5 oneM2M_mgmtCmd_BV_05

□ Test purpose

- AE: Verify that AE can send the Request message to update <mgmtCmd> resource in order to execute the device function.
- CSE: Verify that CSE can work properly and respond the message containing the serialized representation of updated <mgmtCmd> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attribute 'execTarget' including {node} resource id.

□ Test procedure

1) AE sends an 'Update Request' message including "true" value set in 'execEnable' to update <mgmtCmd> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}

- fr = AE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <mgmtCmd> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <mgmtCmd> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem 2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <mgmtCmd> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <mgmtCmd> resource

3) Registrar CSE updates <mgmtCmd> resource properly and send an 'Update Response' mes sage to AE. Additionally, Registrar CSE has to create <execInstance> resource for device co ntrol.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (Updated)
- rqi = (token-string) same as received in request message

- pc = Serialized representation of <mgmtCmd> resource

<<HTTP>>

- Code = 200 (Ok)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of < mgmtCmd > resource

<<CoAP>>

- Response Code = 2.04
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload : Serialized representation of < mgmtCmd > resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of modified < mgmtCmd > resource

□ Pass/Fail Criteria

○ When IUT supports AE,

■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
exe	execEnable	xs:Boolean

■ In Step 4, IUT shall work properly according to the status code in received response message from Registrar CSE.

○ When IUT supports CSE,

■ In Step 2, IUT shall work properly according to the request message from AE.

■ In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

- <mgmtCmd> Attribute

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	

ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
cmt	cmdType	m2m:cmdType
exe	execEnable	xs:Boolean
ext	execTarget	m2m:nodeID

- **<execInstance> Attribute**

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
exs	execStatus	m2m:execStatusType
ext	execTarget	m2m:nodeID

5.18 <execInstance> Resource Test

5.18.1 oneM2M_execInstance_BV_01

□ Test purpose

- AE: Verify that AE can send the Request message to retrieve <execInstance> resource.
- CSE: Verify that CSE can work properly and respond the message containing the serialized re presentation of <execInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attrib ute 'execTarget' including {node} resource id.
- <execInstance> resource with the name {execInstance} has created under {mgmtCmd} in the Registrar CSE.

□ Test procedure

1) AE sends a 'Retrieve Request' message to retrieve <execInstance> resource in the Registra r CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = GET
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: empty

<<CoAP>>

- Method: 0.01 (GET)

- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic: "/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 2 (Retrieve)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE sends the 'Retrieve Response' message containing the serialized representation of <execInstance> resource to AE.
4) Check the 'Retrieve Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc =2000 (OK)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <execInstance> resource

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2000
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of <execInstance> resource

<<CoAP>>

- Response Code = 2.05 (OK)
- oneM2M-RSC: 2000(OK)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of <execInstance> resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc 2000(OK)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of <execInstance> resource

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from AE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	**Attribute Name**	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
exs	execStatus	m2m:execStatusType
exr	execResult	m2m:execResultType
ext	execTarget	m2m:nodeID

5.18.2 oneM2M_execInstance_BV_02

□ Test purpose

- AE: Verify that AE can send the Request message to update <execInstance> resource in order to disable the device control. .
- CSE: Verify that CSE can work properly and respond the message containing the serialized representation of updated <execInstance> resource.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE

- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource with the name {CSEBaseName} has created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attribute 'execTarget' including {node} resource id.
- <execInstance> resource with the name {execInstance} has created under {mgmtCmd} in the Registrar CSE.

□ Test procedure

1) AE sends an 'Update Request' message including "true" value set in 'execDisable' to update <execInstance> resource in the Registrar CSE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Binding Protocol format as follows:

<<oneM2M Primitive>>

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = (token-string)
- pc = Serialized representation of updated <execInstance> resource

<<HTTP>>

- Request method = PUT
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of updated <execInstance> resource

<<CoAP>>

- Method: 0.03 (PUT)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: Serialized representation of updated <execInstance> resource

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- op = 3 (Update)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = Serialized representation of updated <execInstance> resource

3) Registrar CSE updates <execInstance> resource properly and send an 'Update Response' message to AE.
4) Check the 'Update Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2004 (Updated)
- rqi = (token-string) same as received in request message
- pc = Serialized representation of <execInstance> resource

<<HTTP>>

- Code = 200 (Ok)
- X-M2M-RSC: 2004
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json
- Message-body: Serialized representation of < execInstance > resource

<<CoAP>>

- Response Code = 2.04
- oneM2M-RSC: 2004
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload : Serialized representation of < execInstance > resource

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:

- rsc = 2004 (Updated)
- rqi = value of rqi primitive parameter
- pc = Serialized representation of modified < execInstance > resource

□ Pass/Fail Criteria

- ○ When IUT supports AE,
  - ■ In Step 2, IUT shall send the request message containing mandatory attributes in Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
exd	execDisable	xs:Boolean

- In Step 4, IUT shall work properly according to the status code in received response messa ge from Registrar CSE.

- When IUT supports CSE,
  - In Step 2, IUT shall work properly according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message containing mandatory attributes with the proper syntax in the Message-Body as follows.

Mandatory Attribute		Syntax
Short Name	Attribute Name	
ty	resourceType	m2m:resourceType
ri	resourceID	m2m:ID
pi	parentID	m2m:nhURI
ct	creationTime	m2m:timestamp
lt	lastModifiedTime	m2m:timestamp
et	expirationTime	m2m:timestamp
exs	execStatus	m2m:execStatusType
exr	execResult	m2m:execResultType
ext	execTarget	m2m:nodeID

5.18.3 oneM2M_execInstance_BV_03

□ Test purpose

- AE: Verify that AE can send the Request message to delete <execInstance> resource.
- CSE: Verify that CSE can work properly and respond the message in proper format.

□ Test configuration

- oneM2M_CFG_01

□ Applicability

- Node-ADN, Entity-AE
- Node-MN,IN, Entity-CSE

□ Initial Condition

- <CSEBase> resource named {CSEBaseName} have been created in the Registrar CSE.
- <node> resource with the name {node} has created in the Registrar CSE.
- <mgmtCmd> resource with the name {mgmtCmd} has created in the Registrar CSE with attrib ute ‘execTarget’ including {node} resource id.
- <execInstance> resource is created under {mgmtCmd} in the Registrar CSE using the name {execInstance}.

□ Test procedure

1) AE sends a 'Delete Request' message to delete <execInstance> resource in the Registrar C SE.
2) Check the Request message whether it contains corresponding oneM2M Primitive and Bindi ng Protocol format as follows:

<<oneM2M Primitive>>

- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = (token-string)
- pc = empty

<<HTTP>>

- Request method = DELETE
- Request-Target: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- Host : IP address or the FQDN of Registrar CSE
- Accept: application/xml, application/json, application/vnd.onem2m-res+xml or application /vnd.onem2m-res+json
- X-M2M-RI: value of rqi primitive parameter
- X-M2M-Origin: AE-ID
- Message-body: Empty

<<CoAP>>

- Method: 0.04 (DELETE)
- Uri-Host: IP address or the FQDN of Registrar CSE
- Uri-Path: {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- Accept: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+x ml), 10001 (application/vnd.onem2m-res+json)
- oneM2M-FR: AE-ID
- oneM2M-RQI: value of rqi primitive parameter
- Payload: empty

<<MQTT>>

- Topic:"/oneM2M/req/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- op = 4 (Delete)
- to = {CSE-ID}/{CSEBaseName}/{mgmtCmd}/{execInstance}
- fr = AE-ID
- rqi = value of rqi primitive parameter
- pc = empty

3) Registrar CSE deletes <execInstance> resource properly and send a 'Delete Response' mes sage to AE.
4) Check the 'Delete Response' message whether it contains corresponding oneM2M Primitive and Binding protocol as follows:

<<oneM2M Primitive>>

- rsc = 2002 (DELETED)
- rqi = (token-string) same as received in request message
- pc = empty or contents could be included.

<<HTTP>>

- Status Code = 200 (OK)
- X-M2M-RSC: 2002
- X-M2M-RI: value of rqi primitive parameter
- Content-Type: application/xml, application/json, application/vnd.onem2m-res+xml or application/vnd.onem2m-res+json if applicable
- Message-body: empty or contents could be included.

<<CoAP>>

- Response Code = 2.02
- oneM2M-RSC: 2002(DELETED)
- oneM2M-RQI: value of rqi primitive parameter
- Content-Format: 41 (application/xml), 50 (application/json), 10000 (application/vnd.onem2m-res+xml), 10001 (application/vnd.onem2m-res+json)
- Payload: empty or contents could be included.

<<MQTT>>

- Topic:"/oneM2M/resp/<SP-Relative-AE-ID>/<Registrar SP-Relative-CSE-ID>"
- Payload:
- rsc = 2002 (DELETED)
- rqi = value of rqi primitive parameter

□ Pass/Fail Criteria

- When IUT supports AE,
  - In Step 2, IUT shall send the request message in proper format.
  - In Step 4, IUT shall work properly according to the status code in received response message from CSE.
- When IUT supports CSE,
  - In Step 2, IUT shall successfully delete <execInstance> resource according to the request message from AE.
  - In Step 4, IUT shall successfully respond the message in proper format.