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| INPUT CONTRIBUTION |
| Group Name:\* | TDE #47 |
| Title:\* | Interop test cases for haim |
| Source:\* | KETI and EGM |
| Contact: | JaeSeung Song, KETI, jssong@sejong.ac.kr Sherzod Elamanov, KETI, selamanov@gmail.com Franck Le-Gall, EGM, franck.le-gall@eglobalmark.com Ahmed ABID, EGM, ahmed.abid@eglobalmark.com |
| Date:\* | 2020-10-06 |
| Abstract:\* | The contribution proposes some Interoperability Test Descriptions for HAIM management to be added to TS-0013 |
| Agenda Item:\* | TBD |
| Work item(s): |  |
| Document(s) Impacted\* | TS-0013 |
| Intended purpose ofdocument:\* | [x]  Decision[x]  Discussion[ ]  Information[ ]  Other <specify> |
| Decision requested or recommendation:\* | Incorporate the proposed text into TS-0013 |

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1. **Introduction**

This contribution consists of some test descriptions about HAIM management to be included into the TS-0013.

The clause numbers and the TD identifier names in the following proposal may change when included in to TS-0013.

1. **Proposal**

### -----------------------Start of change 1-------------------------------------------

### 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

The following referenced documents are necessary for the application of the present document.

[1] oneM2M TS-0001: "Functional Architecture- Release 3".

[2] oneM2M TS-0004 "Service Layer Core protocol Specification - Release 3".

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

[4] oneM2M TS-0009: "HTTP Protocol Binding - Release 3".

[5] oneM2M TS-001: "MQTT Protocol Binding - Release 3".

[6] oneM2M TS-0015: "Testing Framework".

[7] oneM2M TS-0011: "Common Terminology".

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

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

[10] oneM2M TS-0005: "Management Enablement (OMA) - Release 3".

[11] oneM2M TS-0006: "Management Enablement (BBF) - Release 3".

[12] oneM2M TS-0003: "Security Solutions - Release 3".

[13] oneM2M TS-0034: "Semantics Support - Release 3".

[14] oneM2M TS-0023: " Home Appliances Information Model and Mapping – Release 3".

[15] oneM2M TS-0026: " 3GPP interworking – Release 4".

[16] oneM2M TS-0040: " Modbus Interworking – Release 4".

### -----------------------End of change 1-------------------------------------------

### -----------------------Start of change 2-------------------------------------------

## 8.5 HAIM Device Model

### 8.5.5 HAIM Power Outlet SubDevice Create

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_160 |
| **Objective:** | AE1 creates a Power Outlet SubDevice Model |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0023 [14], clause 5.4.1.2 |
|  |
| **Pre-test conditions:** | * AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceSmartPlug
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to create a <flexContainer> for subDevicePowerOutlet |
| 2 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <AE1> resource/resource name of deviceSmartPlug
* fr = AE-ID
* rqi = (token-string)
* ty = 28 (flexContainer)
* pc = Serialized representation of <flexContainer> resource with proper *containerDefinition*
 |
| 3 |  | IOP Check | Check if possible that the <flexContainer> resource is created in registrar CSE. |
| 4 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 5 |  | IOP Check | AE indicates successful operation |
| 6 |  | Stimulus | AE1 sends a request to create a <flexContainer> for binarySwitch |
| 7 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <AE1> resource/resource name of subDevicePowerOutlet
* fr = AE-ID
* rqi = (token-string)
* ty = 28 (flexContainer)
* pc = Serialized representation of <flexContainer> resource with proper *containerDefinition*
 |
| 8 |  | IOP Check | Check if possible that the <flexContainer> resource is created in registrar CSE. |
| 9 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | AE indicates successful operation |
| Note | Optional: Repeat steps 6-10 for additional subDevicePowerOutlet Modules |
| IOP Verdict |  |
| PRO Verdict |  |

### 8.5.6 HAIM Toggle Action Create

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_161 |
| **Objective:** | AE1 creates a Toggle Action Model |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0023 [14], clause 5.3.1.12 |
|  |
| **Pre-test conditions:** | * AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceSmartPlug
* AE1 has created a <flexContainer> for binarySwtich as a child of deviceSmartPlug
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to create a <flexContainer> for Toggle |
| 2 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <AE1> resource/resource name of binarySwtich
* fr = AE-ID
* rqi = (token-string)
* ty = 28 (flexContainer)
* pc = Serialized representation of <flexContainer> resource with proper *containerDefinition*
 |
| 3 |  | IOP Check | Check if possible that the <flexContainer> resource is created in registrar CSE. |
| 4 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 5 |  | IOP Check | AE indicates successful operation |
| IOP Verdict |  |
| PRO Verdict |  |

### 8.5.7 HAIM Device Properties Create

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_162 |
| **Objective:** | AE1 creates Device Properties Model |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0023 [14], clause 6.2.5 |
|  |
| **Pre-test conditions:** | * AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceLight
* AE1 has created a <node> resource
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to create a [deviceInfo] resource |
| 2 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <node> resource/
* fr = AE-ID
* rqi = (token-string)
* ty = 13 (mgmtObj)
* pc = Serialized representation of [deviceInfo] resource with with properties set as attributes of the resource
 |
| 3 |  | IOP Check | Check if possible that the [deviceInfo] resource is created in registrar CSE. |
| 4 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of [deviceInfo] resource
 |
| 5 |  | IOP Check | AE indicates successful operation |
| IOP Verdict |  |
| PRO Verdict |  |

## 8.6 Modbus Interworking

### 8.6.1 Modbus Thermometer Device Create

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_163 |
| **Objective:** | AE1 creates Device Model for Modbus device |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0040 [], clause 6.3 |
|  |
| **Pre-test conditions:** | * AE1 is running in Modbus IPE
* AE1 has created an application resource <AE> on registrar CSE
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to create a <flexContainer> resource for Modbus deviceThermometer |
| 2 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <AE1> resource
* fr = AE1-ID
* rqi = (token-string)
* ty = 28 (flexContainer)
* pc = Serialized representation of <flexContainer> resource with proper *containerDefinition*
 |
| 3 |  | IOP Check | Check if possible that the <flexContainer> resource is created in registrar CSE. |
| 4 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 5 |  | IOP Check | AE indicates successful operation |
| 6 |  | Stimulus | AE1 sends a request to create a <flexContainer> for temperature |
| 7 | Mca | PRO Check Primitive  | * op = 1 (Create)
* to = {CSEBaseName}/URI of <AE1> resource/resource name of Modbus deviceLight
* fr = AE1-ID
* rqi = (token-string)
* ty = 28 (flexContainer)
* pc = Serialized representation of <flexContainer> resource with proper *containerDefinition and nodnProperties*
 |
| 8 |  | IOP Check | Check if possible that the <flexContainer> resource is created in registrar CSE. |
| 9 | Mca | PRO Check Primitive | * rsc = 2001 (CREATED)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | AE indicates successful operation |
| Note | Optional: Repeat steps 5-10 for battery Module |
| IOP Verdict |  |
| PRO Verdict |  |

### 8.6.2 Retrieve data from a Modbus Thermometer device

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_164 |
| **Objective:** | Modbus IPE reads data from Modbus device and updates Registrar CSE with the read data |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0040 [], clause 6.5.1 |
|  |
| **Pre-test conditions:** | * AE1 is running in Modbus IPE
* AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceThermometer
* AE1 has created a <flexContainer> for temperature as a child of deviceThermometer
* AE2 has created an application resource <AE> on registrar CSE
* AE2 has created a <subscription> resource as a child of temperature
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to retrieve a <flexContainer> resource for temperature |
| 2 | Mca | PRO Check Primitive  | * op = 2 (Retrieve)
* to = {CSEBaseName}/URI of <deviceThermometer> resource/ temperature
* fr = AE1-ID
* rqi = (token-string)
 |
| 3 | Mca | PRO Check Primitive | * pc = Serialized representation of <flexContainer> resource
* rsc = 2000 (OK)
 |
| 4 |  | IOP Check | AE1 indicates successful operation |
| 5 |  | Stimulus | Modbus IPE sends a request(s) to retrieve data from Modbus Thermometer device |
| 6 |  | IOP Check | Check if possible that Modbus IPE has successfully retrieved data from Modbus device |
| 7 |  | Stimulus | AE1 sends a request to update a <flexContainer> resource for deviceThermometer |
| 8 | Mca | PRO Check Primitive | * op = 3 (Update)
* to = {CSEBaseName}/URI of deviceThermometer/temperature
* fr = AE1-ID
* rqi = (token-string)
* pc = Serialized representation of updated <flexContainer> resource
 |
| 9 | Mca | PRO Check Primitive | * rsc = 2004 (Updated)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | Check if possible that the < flexContainer > resource for temperature is updated in Registrar CSE. Registrar CSE sends a notification to AE2 |
| 11 | Mca | PRO Check Primitive | * op = 5 (Notify)
* to = AE2-ID
* from = Registrar CSE-ID
* rqi = (token-string)
* pc = Serialized representation of Notification data object
 |
| 12 | Mca | PRO Check Primitive | AE2 responds to notification* rsc = 2000 (OK)
* rqi = (token-string) same as received in request message
 |
| 13 |  | IOP Check | AE2 indicates notification received |
| IOP Verdict |  |
| PRO Verdict |  |

### 8.6.3 Write data to a Modbus Thermometer device

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_165 |
| **Objective:** | AE writes data into a Modbus device by updating <flexContainer> resource in Registrar CSE  |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** | oneM2M TS-0040 [], clause 6.5.2 |
|  |
| **Pre-test conditions:** | * AE1 is running in Modbus IPE
* AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceThermometer
* AE1 has created a <flexContainer> for temperature as a child of deviceThermometer
* AE2 has created an application resource <AE> on registrar CSE
* AE2 has created a <subscription> resource as a child of temperature (notificationEventType = Blocking\_Update)
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE2 is requested to send a flexContainer Update Request to update the any customAttribute of the resource. |
| 2 | Mca | PRO Check Primitive  | * op = 3 (Update)
* to = {CSEBaseName}/URI of <flexContainer> resource
* fr = AE-ID
* rqi = (token-string)
* pc = Serialized representation of updated <flexContainer> resource
 |
| 3 |  | IOP Check | Check that Registrar CSE sent a notification to AE1 |
| 4 | Mca | PRO Check Primitive  | * op = 5 (Notify)
* to = AE1-ID
* from = Registrar CSE-ID
* rqi = (token-string)
* pc = Serialized representation of Notification data object
 |
| 5 |  | Stimulus | Modbus IPE sends a request(s) to write data to Modbus Thermometer device |
| 6 |  | IOP Check | Check if possible that Modbus IPE has successfully written data to Modbus device |
| 7 |  | Stimulus | AE1 sends a response to notification to Registrar CSE |
| 8 | Mca | PRO Check Primitive | Sent response contains* rsc = 2000 (OK)
* rqi = (token-string) same as received in request message
 |
| 9 | Mca | PRO Check Primitive | Registrar CSE sends a response to AE2* rsc = 2004 (Updated)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | AE2 indicates successful operation |
| IOP Verdict |  |
| PRO Verdict |  |

## 8.7 NoDN Interworking

### 8.7.1 Retrieve data from a NoDN Thermometer device

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_166 |
| **Objective:** | NoDN IPE reads data from a NoDN Thermometer device and updates Registrar CSE with the read data |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** |  |
|  |
| **Pre-test conditions:** | * AE1 is running in NoDN IPE
* AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceThermometer
* AE1 has created a <flexContainer> for temperature as a child of deviceThermometer
* AE2 has created an application resource <AE> on registrar CSE
* AE2 has created a <subscription> resource as a child of temperature
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE1 sends a request to retrieve a <flexContainer> resource for temperature |
| 2 | Mca | PRO Check Primitive  | * op = 2 (Retrieve)
* to = {CSEBaseName}/URI of <deviceThermometer> resource/ temperature
* fr = AE1-ID
* rqi = (token-string)
 |
| 3 | Mca | PRO Check Primitive | * pc = Serialized representation of <flexContainer> resource
* rsc = 2000 (OK)
 |
| 4 |  | IOP Check | AE1 indicates successful operation |
| 5 |  | Stimulus | NoDN IPE retrieves data from NoDN Thermometer device |
| 6 |  | IOP Check | Check if possible that NoDN IPE has successfully retrieved data from NoDN device |
| 7 |  | Stimulus | AE1 sends a request to update a <flexContainer> resource for deviceThermometer |
| 8 | Mca | PRO Check Primitive | * op = 3 (Update)
* to = {CSEBaseName}/URI of deviceThermometer/temperature
* fr = AE1-ID
* rqi = (token-string)
* pc = Serialized representation of updated <flexContainer> resource
 |
| 9 | Mca | PRO Check Primitive | * rsc = 2004 (Updated)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | Check if possible that the <flexContainer> resource for temperature is updated in Registrar CSE. Registrar CSE sends a notification to AE2 |
| 11 | Mca | PRO Check Primitive | * op = 5 (Notify)
* to = AE2-ID
* from = Registrar CSE-ID
* rqi = (token-string)
* pc = Serialized representation of Notification data object
 |
| 12 | Mca | PRO Check Primitive | AE2 responds to notification* rsc = 2000 (OK)
* rqi = (token-string) same as received in request message
 |
| 13 |  | IOP Check | AE2 indicates notification received |
| IOP Verdict |  |
| PRO Verdict |  |

### 8.7.2 Write data to a NoDN Thermometer device

| **Interoperability Test Description** |
| --- |
| **Identifier:** | TD\_M2M\_NH\_167 |
| **Objective:** | AE writes data into a NoDN device by updating <flexContainer> resource in Registrar CSE |
| **Configuration:** | M2M\_CFG\_10 |
| **References:** |  |
|  |
| **Pre-test conditions:** | * AE1 is running in No-DN IPE
* AE1 has created an application resource <AE> on registrar CSE
* AE1 has created a <flexContainer> for deviceThermometer
* AE1 has created a <flexContainer> for temperature as a child of deviceThermometer
* AE2 has created an application resource <AE> on registrar CSE
* AE2 has created a <subscription> resource as a child of temperature (notificationEventType = Blocking\_Update)
 |
| **Test Sequence** |
| **Step** | **RP** | **Type** | **Description** |
| 1 |  | Stimulus | AE2 is requested to send a flexContainer Update Request to update the any customAttribute of the resource. |
| 2 | Mca | PRO Check Primitive  | * op = 3 (Update)
* to = {CSEBaseName}/URI of <flexContainer> resource
* fr = AE-ID
* rqi = (token-string)
* pc = Serialized representation of updated <flexContainer> resource
 |
| 3 |  | IOP Check | Check that Registrar CSE sent a notification to AE1 |
| 4 | Mca | PRO Check Primitive  | * op = 5 (Notify)
* to = AE1-ID
* from = Registrar CSE-ID
* rqi = (token-string)
* pc = Serialized representation of Notification data object
 |
| 5 |  | Stimulus | NoDN IPE sends a request(s) to write data to NoDN Thermometer device |
| 6 |  | IOP Check | Check if possible that NoDN IPE has successfully written data to NoDN device |
| 7 |  | Stimulus | AE1 sends a response to notification to Registrar CSE |
| 8 | Mca | PRO Check Primitive | Sent response contains* rsc = 2000 (OK)
* rqi = (token-string) same as received in request message
 |
| 9 | Mca | PRO Check Primitive | Registrar CSE sends a response to AE2* rsc = 2004 (Updated)
* rqi = (token-string) same as received in request message
* pc = Serialized representation of <flexContainer> resource
 |
| 10 |  | IOP Check | AE2 indicates successful operation |
| IOP Verdict |  |
| PRO Verdict |  |

### -----------------------End of change 2-------------------------------------------