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| INPUT CONTRIBUTION | |
| Group Name:\* | TDE #47 |
| Title:\* | Interop test cases for haim |
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| 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 of  document:\* | Decision  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-------------------------------------------