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| CHANGE REQUEST |
| Meeting ID:\* |  RDM #47 |
| Source:\* | Cyrille Bareau, Orange, cyrille.bareau@orange.comMarianne Mohali, Orange, marianne.mohali@orange.com  |
| Date:\* | 2020-10-12 |
| Reason for Change/s:\* | See the introduction below |
| CR against: Release\* | Release 4 |
| CR against: WI\* | [x]  Active WI-0099[ ]  MNT maintenance / < Work Item number(optional)>Is this a mirror CR? Yes [ ]  No [ ] mirror CR number: (Note to Rapporteur - use latest agreed revision)[ ]  STE Small Technical Enhancements / < Work Item number (optional)>Only ONE of the above shall be ticked |
| CR against: TS/TR\* | TS-0023 v. 4.5.0 |
| Clauses \* | Modified clauses: 5.8.2, 6.2.1, 6.2.2, 6.2.3, 6.2.4, 6.2.5, 6.2.6, 6.2.7, 6.4.1, 6.3.2New clauses: 5.8.xa to 5.8.xd, 6.4.x |
| Type of change: \* | [ ]  Editorial change[ ]  Bug Fix or Correction[ ]  Change to existing feature or functionality[x]  New feature or functionalityOnly ONE of the above shall be ticked |
| Impacted other TS/TR(s) |  |
| Post Freeze checking:\* | This CR contains only essential changes and corrections? YES [x]  NO [ ] This CR may break backwards compatibility with the last approved version of the TS? YES [ ]  NO [x]  |
| Template Version: January 2017 (Do not modify) |

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## Introduction

In the context of SDT completion and “translation” of <mgmtObj> resources into module classes, at a first step, we have identified some resource specializations which should be added to the SDT.

The lines coloured in green represent the <mgmtObj> types that already have been mapped to <flexContainer> specializations in TS-0023.

The lines coloured in yellow represent the <mgmtObj> types for which a mapping to a <flexContainer> specialization is missing and proposed to be added to TS-0023.

| Resource specialization  | Short Description |  |
| --- | --- | --- |
| *areaNwkDeviceInfo* | Provides information about the Node in the M2M Area Network | To be added in TS-0023 |
| *areaNwkInfo* | Describes the list of Nodes attached behind the MN node and its physical or underlying relation among the nodes in the M2M Area Network | To be added in TS-0023 |
| *battery*  | Provides the power information of the node (e.g. remaining battery charge) | TS-0023 “5.3.1.10 battery”, referenced in TS-0023 “5.8.2 flexNode” |
| *deviceCapability*  | Contains information about the capability supported by the Node | To be added in TS-0023 |
| *deviceInfo*  | Contains information about the identity, manufacturer and model number of the device | TS-0023 “5.8.4 dmDeviceInfo” |
| *eventLog* | Contains information about the log of events of the Node | TS-0023 “5.8.8 dmEventLog” |
| *firmware* | Provides information about the firmware of the Node (e.g. name, version) | TS-0023 “5.8.6 dmFirmware” |
| *memory* | Provides the memory (typically RAM) information of the node (e.g. the amount of total volatile memory) | TS-0023 “5.8.3 dmAgent” |
| *reboot* | Used to reboot or reset the Node | TS-0023 “5.8.3 dmAgent” |
| *software* | Provides information about the software of the Node | TS-0023 “5.8.7 dmSoftware” |
| *storage*  | To manage available storage memory on the device | To be added in TS-0023 |

This CR introduces 4 new resource specializations to TS-0023 that are [areaNwkDeviceInfo], [areaNwkInfo], [deviceCapability] and [storage].

Resources areaNwkDeviceInfo, deviceCapability and storage are quite straightforwardly translated into SDT module classes. For [areaNwkInfo], this <mgmtObj> handles in fact a list of [areaNwkDeviceInfo]s, but not in a hierarchical manner because <mgmtObj> cannot have other <mgmtObj> resources as children. This restriction does not exist with <flexContainers>, thus we can map [areaNwkInfo] as a <flexContainer>, like SubDevices in the SDT model, which is the parent of [areaNwkDeviceInfo] module classes.

In a further step, these new SDT specializations could be enhanced but this question is not addressed by this CR.

We also brought some modifications in the Mapping Rules where some clarifications were needed.

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

### 5.8.2 flexNode

This flexContainer specialization is the root for SDT-based Device Management modules.

It is targeted by the *flexNodeLink* attribute of *<flexContainer>* SDT devices (see in 6.2.2 the rules 1-6, 1-7 and 1-8).

Table 5.8.2-1: Subdevice of flexNode model

|  |  |  |  |
| --- | --- | --- | --- |
| Subdevice Instance Name | Subdevice Name | Multiplicity | Description |
| dmAreaNwkInfo | dmAreaNwkInfo | 0..N | See clause 5.8.10 |

The word ‘SubDevice’ refers to the SDT structure as defined in clause 5.2.1, i.e. a resource that is the child of the root resource (Device, of flexNode here), and that can be the parent of Property and/or Module resources. It is mapped as a <flexContainer> resource (see clause 6.2.7).

Table 5.8.2‑2: Modules of flexNode model

|  |  |  |  |
| --- | --- | --- | --- |
| Module Instance Name | Module Class Name | Multiplicity | Description |
| dmAgent | dmAgent | 0..1 | See clause 5.8.3 |
| dmDeviceInfo | dmDeviceInfo | 1 | See clause 5.8.4 |
| dmDataModelIO | dmDataModelIO | 0..N | See clause 5.8.5 |
| dmFirmware | dmFirmware | 1..N | See clause 5.8.6. |
| dmSoftware | dmSoftware | 0..N | See clause 5.8.7 |
| dmEventLog | dmEventLog | 0..N | See clause 5.8.8 |
| dmPackage  | dmPackage | 0..N | See clause 5.8.9 |
| battery | battery | 0..N | See clause 5.3.1.10 |
| dmCapability | dmCapability | 0..N | See clause 5.8.12 |
| dmStorage | dmStorage | 0..N | See clause 5.8.13 |

NOTE: The current list of modules for Device Management is not fixed and can evolve with new optional features.

Table 5.8.2-2: Resource Specific Attributes of [*flexNode*] resource

| Attributes of *[flexNode]* | Multiplicity | RW/RO/WO | Description | *[flexNodeAnnc]* attributes |
| --- | --- | --- | --- | --- |
| *nodeLink*  | 0..1 | RW | The resource identifier of a <node> resource, if any, that stores the node specific information of the NoDN on which the interworked service represented by this [flexNode]> resource resides.  |  |
| *hostedAELinks* | 0..1(L) | RO | This attribute allows to find the AEs that are represented by this [*flexNode*] resource, if any. The attribute shall contain a list of resource identifiers of *<AE>* resources representing the ADN-Aes that are represented by the current [*flexNode*] resource. | OA |
| *hostedServiceLinks* | 0..1(L) | RO | This attribute allows to find SDT device <*flexContainer>* resources that havebeen created to represent services hosted on a device (ADN or NoDN proxied by an IPE), the device being represented by this [*flexNode*] resource. If the device hosts a set of services represented by SDT device <*flexContainer>s,* then the attribute shall contain the list of resource identifiers of these <*flexContainer>* resources. | OA |

If the <flexContainer>(s) that are listed in the *hostedServiceLinks* attribute have a *nodeLink* attribute that points to a <node>, then :

- if there are more than one such <flexContainer>, they shall all have the same *nodeLink* attribute value, and

- this [flexNode] resource shall have a *nodeLink* attribute with the same value.

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

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

### 5.8.10 dmAreaNwkInfo

A dmAreaNwkInfo is a <flexContainer> resource that expresses the information about the devices in a M2M Area Network managed by the parent flexNode.

Table 5.8.10-1: Properties of dmAreaNwkInfo model

|  |  |  |  |
| --- | --- | --- | --- |
| Property Name | Property Type | Multiplicity | Description |
| areaNwkType | xs :string | 1 | Indicates the type of M2M Area Network |

Table 5.8.10-2: Modules of dmAreaNwkInfo model

|  |  |  |  |
| --- | --- | --- | --- |
| Module Instance Name | Module Class Name | Multiplicity | Description |
| dmAreaNwkDeviceInfo | dmAreaNwkDeviceInfo | 0..N | See clause 5.8.11 |

### 5.8.11 dmAreaNwkDeviceInfo

This ModuleClass is used to share information regarding the devices in the M2M Area Network.

Table 5.8.11-1 DataPoints of dmAreaNwkDeviceInfo ModuleClass

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Type | R/W | Optional | Unit | Description |
| devId  | xs:string | R | false |  | Indicates the id of the device. It could be the id of the hardware or nodeId. |
| devType | xs:string | R | false |  | Indicates the type of the device. The attribute also indicates the functions or services that are provided by the device. Examples include temperature sensor, actuator, Zigbee coordinator or Zigbee router |
| sleepInterval | xs:integer | R | true | seconds | The interval between two sleeps.  |
| sleepDuration | xs:integer | R | true | seconds | The time duration of each sleep. |
| status | xs:string | R | true |  | The status of the device (sleeping or waked up). |

### 5.8.12 dmCapability

This ModuleClass is used to model the service capabilities of a managed device.

Table 5.8.12-1: Actions of dmCapability ModuleClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return Type | Name | Argument | Optional | Documentation |
| none | enable | none | true | The action that allows enabling the device capability. |
| none | disable | none | true | The action that allows disabling the device capability. |

Table 5.8.12-2 DataPoints of dmCapability ModuleClass

| Name | Type | R/W | Optional | Unit | Description |
| --- | --- | --- | --- | --- | --- |
| name | xs:string | R | false |  | The name of the device capability. |
| attached | xs:boolean | R | false |  | Indicates whether the capability is currently attached to the device or not. |
| actionStatus | m2m:actionStatus | R | false |  | Indicates the status of the Action (including a performed action and the corresponding final state).  |
| currentState | xs: boolean | R | false |  | Indicates the current state of the capability (e.g. enabled or disabled). |

### 5.8.13 dmStorage

This ModuleClass is used to model the storage on a managed device.

Table 5.8.13-1: Actions of dmStorage ModuleClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return Type | Name | Argument | Optional | Documentation |
| none | format | none | true | The action that allows to format the mounted storage. |
| none | unmount | none | true | The action that allows to safety eject storage device. |

Table 5.8.13-2 DataPoints of dmStorage ModuleClass

| Name | Type | R/W | Optional | Unit | Description |
| --- | --- | --- | --- | --- | --- |
| UUID | xs:string | R | true |  | The uuid of the storage device.  |
| type | xs:integer | R | true |  | Indicates the type of storage. 0 indicates internal and 1 indiciates external.  |
| name | xs:string | RW | true |  | Indicates name of the mounted storage.  |
| writeSpeed | xs:integer | R | true |  | Indicates the write speed of storage device.  |
| readSpeed | xs:integer | R | true |  | Indicates the read speed of storage device.  |
| availStorage | xs:integer | R | false | MB | Indicates the current available amount of memory.  |
| totalStorage | xs:integer | R | false | MB | Indicates the total amount of memory available.  |
| presence | xs:integer | R | true |  | Indicates current presence status of memory card. 0 indicates card is ejected, 1 indicates card is inserted.  |
| status | xs:integer | R | true |  | Indicates current operation status of storage. 1 –indicates storage is ready, 0 indicates storage is busy.  |
| mounts | xs:integer | R | true |  | Indicates number of successful mounts of the storage.  |
| forcedUnmounts | xs:integer | R | true |  | Indicates number of forced unmounts of the storage.  |
| fileSystem | xs:string | RW | true |  | Indicates the filesystem type used on the mounted storage.  |
| mountingPoint | xs:string | RW | true |  | Indicates mounting point of the mounted storage.  |
| mountOptions | xs:string | R | true |  | Indicates additional file system specific and file system independent mount options that indicate specific behaviours of the mount point as well as the capabilities of the underlying file system. |
| writable | xs:boolean | R | false |  | Indicates whether the storage volume is mounted as read/write (“TRUE”) or read-only (“FALSE”).  |

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

### ----------------------- Start of change 3 --------------------------------------------

## 6.2 The Resource Mapping Rules

### 6.2.1 Introduction

The present clause specifies the rule to map the "Harmonized Information Model" to oneM2M resources.

### 6.2.2 Resource mapping for Device model

When the AE exposes a controlling interface for a home domain device which is specified as an information model in clause 5.5, a specialization of the <flexContainer> resource shall be created as the mapping of the model following conversion rules:

* Rule 1-1: Each Device model defined in clause 5.5 shall be mapped to a specialization of <flexContainer>. The *containerDefinition* attribute shall be set according to 6.4.2.
* Rule 1-2: Each entry in the 'Module' table shall be mapped to a child resource(s) which is mapped as a specialised <flexContainer> following the rule in clause 6.2.3.
* Rule 1-3: The specialized <flexContainer> resource of the Device model may contain an optional attribute *nodeLink* (as defined in TS-0001[3] and in TS-0004[4]). The value of *nodeLink* shall be set to the resource identifier of a <node> resource described in Rule 1-5 below. See also Rule 1-8.
* Rule 1-4: XSD file for each Device model shall be named according to 6.5.2.
* Rule 1-5: If the *nodeLink* attribute is present, a <node> resource shall be created on the same hosting CSE as the <flexContainer> representing this Device model. The <node> resource contains all the management information as specialized <mgmtObj> resources (e.g. [firmware]) about the Device model instance for device management purposes.
* Rule 1-6: The specialized <flexContainer> resource of the Device model may contain an optional [customAttribute] named *flexNodeLink*. The value of *flexNodeLink* shall be set to the resource identifier of a <flexContainer> resource described in Rule 1-7 below. See also Rule 1-8.
* Rule 1-7: If the *flexNodeLink* [customAttribute] is present, a [flexNode] specialization of a <flexContainer> resource shall be created on the same hosting CSE as the <flexContainer> representing this Device model. This [flexNode] resource contains all the Device Management information as specialized <flexContainer> resources defined in 5.8 (e.g. [dmFirmware]) about the device model instance for Device Management purposes.
* Rule 1-8: at least one of *nodeLink* (Rule 1-3) or *flexNodeLink* (Rule 1-6) shall be present. If both are present, the [flexNode] resource pointed to by the *flexNodeLink* custom attribute shall contain a *nodeLink* attribute with the same value as this device model’s *nodeLink*.
* Rule 1-9: Each entry in the 'SubDevice' table shall be mapped to a child resource(s) which is mapped as a specialised <flexContainer> following the rule in clause 6.2.7.

### 6.2.3 Resource mapping for ModuleClass

The ModuleClass models shall be mapped to the specializations of a <flexContainer> resource. The following rules shall be applied:

When the Device or SubDevice models in clauses 5.4, 5.5, 5.8.2 or 5.8.10 are mapped to the <flexContainer> resource, and if the device or sub-device supports the functionality associated with a ModuleClass in the model, a <flexContainer> resource which is mapped from ModuleClass definitions shall be created as a child resource:

* Rule 2-1: The containerDefinition attribute shall be set according to 6.4.3.
* Rule 2-2: Each entry of 'Action', 'Property', and 'DataPoint' in ModuleClass definitions shall be mapped following the resource mapping rules described in clauses 6.2.4 - 6.2.6.
* Rule 2-3: XSD file for each ModuleClass shall be named according to 6.5.3.
* Rule 2-4: The *resourceName* attribute for each module class that appears as a child of a Device or SubDevice model shall be CREATED with the value set to “Module Instance Name”. If the module class is contained in a list (multiplicity 0..N or 1..N), its *resourceName* attribute shall be set to “Module Instance Name” appended with an underscore ‘\_’ and an incrementing index so that it is unique in the parent’s children (e.g. “firmware\_0”, “firmware\_1”, etc.). The index shall not have leading 0’s.
* Rule 2-5: The specialized <flexContainer> resource of the Module model may contain an optional [customAttribute] named *dataGenerationTime*. The value of *dataGenerationTime* contains the time when the data was generated by the device. The data type of this custom attribute is m2m:timestamp.

### 6.2.4 Resource mapping for Action

Actions defined as part of a ModuleClass model shall be mapped to the specializations of a <flexContainer> resource. The following rules shall be applied:

* Rule 3-1: The *containerDefinition* attribute shall be set according to 6.4.4.
* Rule 3-2: When the Action supports any 'Arguments' or 'Return Type', they are mapped to [customizedAttribute] with its variable names (short names are given in clause 6.3.4).
* Rule 3-3: XSD file for each Action shall be named according to 6.5.4.
* Rule 3-4: The Action shall be triggered:
	+ by updating at least one of the Arguments custom attributes with any value, if the action has at least one argument, or
	+ by updating the <flexContainer> resource with *empty content* if it has no argument
* Rule 3-5: The *resourceName* attribute for each Action model that appears as a child of a ModuleClass model shall be CREATED with the value set to “Action name”.
* Rule 3-6: If an action returns a value that is of a complex data type, i.e. not one of the standard scalar types, then this value shall be encoded as a JSON structure and returned serialized in an xs:string.

### 6.2.5 Resource mapping for Property

When the Device model (in clause 5.5) or the ModuleClass model (in clause 5.3) is mapped to the <flexContainer> resource, and if the device supports a Property, the following rules shall be applied:

* Rule 4-1: Each entry of ‘Property’ table in ModuleClass model, shall be mapped to the [customAttribute] of <flexContainer> resource which is mapped from associated ModuleClass model, with its Property name with prefix 'prop'.
* Rule 4-2: Each ‘Property’ of a Device model is either mapped to a specialized [objectAttribute] of a [deviceInfo] <mgmtObj> resource following Rule 1-3, when the *nodeLink* attribute is present, or to a [customAttribute] of a [dmDeviceInfo] <flexContainer> resource following Rule 1-6 otherwise.
* Rule 4-3: Each entry of ‘Property’ table in SubDevice model, shall be mapped to the [customAttribute] of <flexContainer> resource which is mapped from associated SubDevice model, with its Property name with prefix 'prop'.

### 6.2.6 Resource mapping for DataPoint

When the ModuleClass model (in clause 5.3) is mapped to the <flexContainer> resouce, and if the ModuleClass supports a DataPoint, the following rules shall be applied:

* Rule 5-1: Each entry of DataPoint table in ModuleClass model, shall be mapped to [customAttribute] of <flexContainer> resource which is mapped from associated ModuleClass model, with its DataPoint name.

### 6.2.7 Resource mapping for SubDevice model

The SubDevice models (in clause 5.4 or 5.8.10) shall be mapped to the specializations of a <flexContainer> resource. The following rules shall be applied:

When the SubDevice model in clause 5.4 or 5.8.10 is mapped to the <flexContainer> resource, and if the device supports the functionality associated with a SubDevice in the model, a <flexContainer> resource which is mapped from SubDevices definitions shall be created as a child resource.

* Rule 7-1: The containerDefinition attribute shall be set according to 6.4.5.
* Rule 7-1b: Each entry in the 'Module' table shall be mapped to a child resource(s) which is mapped as a specialised <flexContainer> following the rule in clause 6.2.3.
* Rule 7-2: The XSD file for each SubDevice model shall be named according to 6.5.5.
* Rule 7-3: void.

Rule 7-4: The *resourceName* attribute for each SubDevice that appears as a child of a Device or FlexNode model shall be created with the value set to “SubDevice Instance Name”. If the SubDevice is contained in a list (multiplicity 0..N or 1..N), its *resourceName* attribute shall be set to “SubDevice Instance Name” appended with an underscore ‘\_’ and an incrementing index so that it is unique in the parent’s children (e.g. “cuff\_0”, “cuff\_1”, etc.). The index shall not have leading 0’s.

### ----------------------- End of change 3 --------------------------------------------

### ----------------------- Start of change 4 --------------------------------------------

### 6.4.1 Device models

The containerDefinition attribute of specializations for device models defined in clause 5.5 shall have the values that comply with the following rule.

* Rule: “org.onem2m.home.device.[device name]”

For example, the containerDefinition attribute of specialization for deviceAirConditioner shall be “org.onem2m.home.device.deviceAirConditioner”.

The containerDefinition of the [flexNode] model defined in clause 5.8. shall be “org.onem2m.devicemanagement.flexNode”.

### ----------------------- End of change 4 --------------------------------------------

### ----------------------- Start of change 5 --------------------------------------------

### 6.4.5 SubDevice models

The containerDefinition attribute of specializations for sub-device models defined in clause 5.4 shall have the values that comply with the following rule.

* Rule: “org.onem2m.home.subdevice.[sub-device name]”

For example, the containerDefinition attribute of specialization for subDeviceCuff shall be “org.onem2m.home.subdevice.subDeviceCuff”.

The containerDefinition of the [dmAreaNwkInfo] model defined in clause 5.8.10. shall be “org.onem2m.devicemanagement.areaNwkInfo”.

### ----------------------- End of change 5 --------------------------------------------

### ----------------------- Start of change 6 --------------------------------------------

### 6.3.2 Resource types

In protocol bindings resource type names for device models shall be translated into short names of Table 6.3.2‑1.

Table 6.3.2‑1: Specialization type short names (Device models)

| Resource Type Name | Short Name |
| --- | --- |
| Device3DPrinter | ***dTDPr*** |
| deviceAirConditioner | ***deACr*** |
| deviceAirPurifier | ***deAPr*** |
| deviceAirQualityMonitor | ***dAQMr*** |
| deviceAudioReceiver | ***deARr*** |
| deviceBloodPressureMonitor | ***dBPMr*** |
| deviceCamera | ***devCa*** |
| deviceClothesDryer | ***deCDr*** |
| deviceClothesWasher | ***deCWr*** |
| deviceClothesWasherDryer | ***dCWDr*** |
| deviceCoffeeMachine | ***deCMe*** |
| deviceCookerHood | ***deCHd*** |
| deviceCooktop | ***devCp*** |
| deviceDehumidifier | ***devDr*** |
| deviceDishWasher | ***deDWr*** |
| deviceDoor | ***devD0*** |
| deviceDoorLock | ***deDLk*** |
| deviceElectricVehicleCharger | ***dEVCr*** |
| deviceFan | ***devFn*** |
| deviceFoodProbe | ***deFPe*** |
| deviceFreezer | ***devFr*** |
| deviceGlucosemeter | ***devGr*** |
| deviceHeartRateMonitor | ***dHRMr*** |
| deviceHomeCCTV | ***dHCCT*** |
| deviceHumidifier | ***devHr*** |
| deviceKettle | ***devKe*** |
| deviceLight | ***devLt*** |
| deviceMicrogeneration | ***devMn*** |
| deviceMultiFunctionPrinter | ***dMFPr*** |
| deviceOutdoorLamp | ***deOLp*** |
| deviceOven | ***devOn*** |
| devicePrinter | ***devPr*** |
| devicePulseOximeter | ***dePOr*** |
| deviceRefrigerator | ***devRr*** |
| deviceRobotCleaner | ***deRCr*** |
| deviceScanner | ***devSr*** |
| deviceSecurityPanel | ***deSPl*** |
| deviceSetTopBox | ***dSTBx*** |
| deviceSmartElectricMeter | ***dSEMr*** |
| deviceSmartPlug | ***deSPg*** |
| deviceSteamCloset | ***deSCt*** |
| deviceStorageBattery | ***deSBy*** |
| deviceSwitch | ***devSh*** |
| deviceTelevision | ***devTn*** |
| deviceThermometer | ***devTr*** |
| deviceThermostat | ***devTt*** |
| deviceWaterHeater | ***deWHr*** |
| deviceWaterValve | ***deWVe*** |
| deviceWeightScaleAndBodyCompositionAnalyser | ***dWSAB*** |
| deviceWindowShade | ***deWSe*** |
| deviceBottleWarmer | ***deBWr*** |
| deviceGarbageDisposal | ***deGDp*** |
| deviceWaterPurifier | ***deWPr*** |
| flexNode | ***fleNe*** |

In protocol bindings resource type names for SubDevice model shall be translated into short names of Table 6.3.2‑2.

Table 6.3.2‑2: Specialization type short names (SubDevice models)

| Resource Type Name | Short Name |
| --- | --- |
| ~~cuff~~ | ***~~cuff~~*** |
| ~~powerOutlet~~ | ***~~powOt~~*** |
| subDeviceCuff | ***suDCf*** |
| subDevicePowerOutlet | ***sDPOt*** |
| dmAreaNwkInfo | ***dANIo*** |

NOTE: see section 6.2.7, rule 7-4

In protocol bindings resource type names for module classes shall be translated into short names of Table 6.3.2‑3.

Table 6.3.2‑3: Specialization type short names (ModuleClasses and Module Instances)

| Resource Type Name | Short Name |
| --- | --- |
| 3DPrinter | ***thDPr*** |
| acousticSensor | ***acoSr*** |
| airCleanOperationMode | ***aCOM0*** |
| airConJobMode | ***aCJMe*** |
| airConOperationMode | ***aCOMe*** |
| airFlow | ***airFw*** |
| airPurifierJobMode | ***aPJMe*** |
| airPurifierOperationMode | ***aPOMe*** |
| airQualitySensor | ***aiQSr*** |
| alarmSpeaker | ***alaSr*** |
| audioVolume | ***audVe*** |
| autoDocumentFeeder | ***auDFr*** |
| battery | ***bat*** |
| binaryObject | ***binOt*** |
| binarySwitch | ***binSh*** |
| bioElectricalImpedanceAnalysis | ***bEIAs*** |
| bodyCompositionAnalyser | ***boCAr*** |
| boiler | ***boilr*** |
| boilingSwitch | ***boiSh*** |
| brewing | ***brewg*** |
| brewingSwitch | ***breSh*** |
| brightness | ***brigs*** |
| channel | ***chanl*** |
| clock | ***clock*** |
| clothesDryerJobMode | ***cDJMe*** |
| clothesDryerOperationMode | ***cDOMe*** |
| clothesWasherDryerJobMode | ***cWDJM*** |
| clothesWasherDryerOperationMode | ***cWDOM*** |
| clothesWasherJobMode | ***cWJMe*** |
| clothesWasherJobModeOption | ***cWJMO*** |
| clothesWasherOperationMode | ***cWOMe*** |
| colour | ***color*** |
| colourSaturation | ***colSn*** |
| controlPanelLock | ***coPLk*** |
| cookerHoodJobMode | ***cHJMe*** |
| credentials | ***creds*** |
| customTemperature | ***cusTe*** |
| dataGenerationTime | ***dgt*** |
| dehumidifierJobMode | ***deJMe*** |
| dehumidifierOperationMode | ***deOMe*** |
| dishWasherJobMode | ***dWJMe*** |
| dmAgent | ***dmAgt*** |
| dmAreaNwkDeviceInfo | ***dANDo*** |
| dmCapability | ***dmCay*** |
| dmDataModelIO | ***dDMIO*** |
| dmDeviceInfo | ***dmDIo*** |
| dmEventLog | ***dmELg*** |
| dmFirmware | ***dmFie*** |
| dmPackage | ***dmPae*** |
| dmSoftware | ***dmSoe*** |
| dmStorage | ***dmSte*** |
| doorLock | ***dooLk*** |
| doorlock | ***doork*** |
| doorStatus | ***dooSs*** |
| electricVehicleConnector | ***elVCr*** |
| energyConsumption | ***eneCn*** |
| energyGeneration | ***eneGn*** |
| faultDetection | ***fauDn*** |
| filterInfo | ***filIo*** |
| foaming | ***foamg*** |
| fridgeTemperature | ***friTe*** |
| frozenTemperature | ***froTe*** |
| geoLocation | ***geoLn*** |
| glucometer | ***glucr*** |
| grinder | ***grinr*** |
| heatingZone | ***heaZe*** |
| height | ***heigt*** |
| hotWaterSupply | ***hoWSy*** |
| impactSensor | ***impSr*** |
| keepWarm | ***keeWm*** |
| keypad | ***keypd*** |
| liquidLevel | ***liqLl*** |
| liquidRemaining | ***liqRg*** |
| lock | ***lock*** |
| mediaInput | ***medIt*** |
| mediaOutput | ***medOt*** |
| mediaSelect | ***medSt*** |
| milkFoaming | ***milFg*** |
| milkQuantity | ***milQy*** |
| milkStatus | ***milSs*** |
| motionSensor | ***motSr*** |
| numberValue | ***numVe*** |
| openLevel | ***opeLl*** |
| operationMode | ***opeMe*** |
| overcurrentSensor | ***oveSr*** |
| oximeter | ***oximr*** |
| ozoneMeter | ***ozoMr*** |
| phoneCall | ***phoCl*** |
| playerControl | ***plaCl*** |
| powerSave | ***powS0*** |
| printerRunState | ***prRSe*** |
| printQueue | ***priQe*** |
| pulsemeter | ***pulsr*** |
| pushButton | ***pusBn*** |
| recorder | ***recor*** |
| refrigeration | ***refrn*** |
| relativeHumidity | ***relHy*** |
| remoteControlEnable | ***reCEe*** |
| robotCleanerJobMode | ***rCJMe*** |
| robotCleanerOperationMode | ***rCOMe*** |
| runState | ***runSe*** |
| scannerRunState | ***scRSe*** |
| securityMode | ***secMe*** |
| sessionDescription | ***sesDn*** |
| signalStrength | ***sigSh*** |
| sleepTimer | ***sleTr*** |
| smokeSensor | ***smoSr*** |
| sphygmomanometer | ***sphyr*** |
| spinLevel | ***spiLl*** |
| steamClosetJobMode | ***sCJMe*** |
| steamClosetOperationMode | ***sCOMe*** |
| televisionChannel | ***telCl*** |
| temperature | ***tempe*** |
| temperatureAlarm | ***temAm*** |
| textMessage | ***texMe*** |
| timer | ***timer*** |
| turbo | ***turbo*** |
| uvSensor | ***uveSr*** |
| waterFilterInfo | ***waFIo*** |
| waterFlow | ***watFw*** |
| waterSensor | ***watSr*** |
| waterStatus | ***watSs*** |
| weight | ***weigt*** |

In protocol bindings resource type names for actions shall be translated into short names of Table 6.3.2‑4.

Table 6.3.2‑4: Specialization type short names (Actions)

| Resource Type Name | Short Name |
| --- | --- |
| **activate** | actie |
| activateClockTimer | ***acCTr*** |
| answer | ***answr*** |
| call | ***call*** |
| close | ***close*** |
| deactivate | ***deace*** |
| deactivateClockTimer | ***deCTr*** |
| decrementNumberValue | ***deNVe*** |
| deployPackage | ***depPe*** |
| disable | ***disae*** |
| downChannel | ***dowCl*** |
| downVolume | ***dowVe*** |
| enable | ***enabe*** |
| format | ***formt*** |
| hangup | ***hangp*** |
| incrementNumberValue | ***inNVe*** |
| install | ***instl*** |
| nextTrack | ***nexTk*** |
| open | ***open*** |
| previousTrack | ***preTk*** |
| reboot | ***rebot*** |
| readIO | ***reaIO*** |
| resetNumberValue | ***reNVe*** |
| resetTextMessage | ***reTMe*** |
| start3Dprint | ***staDt*** |
| stop3Dprint | ***stoDt*** |
| toggle | ***togge*** |
| uninstall | ***uninl*** |
| unmount | ***unmot*** |
| upChannel | ***uphCl*** |
| updateFirmware | ***updFe*** |
| upVolume | ***upoVe*** |
| writeIO | ***wriIO*** |

### ----------------------- End of change 6 --------------------------------------------