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| CHANGE REQUEST |
| Meeting ID:\* |  RDM #46 |
| Source:\* | Cyrille Bareau, Orange, cyrille.bareau@orange.comMarianne Mohali, Orange, marianne.mohali@orange.com Przemysław Ratuszek, Orange, przemyslaw.ratuszek@orange.com  |
| Date:\* | 2020-07-21 |
| 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. 4.4.1 |
| Clauses \* | Modified clauses: 5.6.47, 5.8.2, 5.8.3, 5.8.7, 6.3.2, 6.3.3New clauses: 5.6.xa, 5.6.xb, 5.8.9 |
| 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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GUIDELINES for Change Requests:

Provide an informative introduction containing the problem(s) being solved, and a summary list of proposals.

Each CR should contain changes related to only one particular issue/problem.

In case of a correction, and the change apply to previous releases, a separate “mirror CR” should be posted at the same time of this CR

Mirror CR: applies only when the text, including clause numbering are exactly the same.

Companion CR: applies when the change means the same but the baselines differ in some way (e.g. clause number).

Follow the principle of completeness, where all changes related to the issue or problem within a deliverable are simultaneously proposed to be made E.g. A change impacting 5 tables should not only include a proposal to change only 3 tables. Includes any changes to references, definitions, and acronyms in the same deliverable.

Follow the drafting rules.

All pictures must be editable.

Check spelling and grammar to the extent practicable.

Use Change bars for modifications.

The change should include the current and surrounding clauses to clearly show where a change is located and to provide technical context of the proposed change. Additions of complete clauses need not show surrounding clauses as long as the proposed clause number clearly shows where the new clause is proposed to be located.

Multiple changes in a single CR shall be clearly separated by horizontal lines with embedded text such as, start of change 1, end of change 1, start of new clause, end of new clause.

When subsequent changes are made to content of a CR, then the accepted version should not show changes over changes. The accepted version of the CR should only show changes relative to the baseline approved text.

Introduction

This draft introduces a new approach to handle software management on NoDN devices based on SDT Device Management technique. The approach is inspired from BBF concepts (used in TR-069 and USP) of separating Deployment Units and Execution Units and the Package resource used for Software Management in OMA LwM2M.

Two module classes are defined: the [dmPackage] module allows installing resources on a device, which can be software images but also libraries, configuration files, web content, etc. The possible actions on this module are to install them on the device (downloading from a URL or a default repository if not pre-installed, and launching them if necessary) and to uninstall, i.e. remove them. The second module class is [dmSoftware], which is created by the IPE, typically after installing one or more dmPackages, for instance a software image, libraries and config files. The possible actions on a dmSoftware module are to activate / deactivate it. When the installation of a dmPackage leads to the creation of one or more dmSoftware module(s), they are associated with the dmPackage (*softwares* datapoint).

The dmPackage modules are created through the *deployPackage* action in the dmAgent module class.

The dmSoftware modules can be seen as ‘high level’ information (“there is such software that is running on this device”), whereas dmPackage modules are ‘low level’ information (“there is such executable file that is deployed on this device”). The possible link between a dmSoftware and one or more dmPackage is left to the IPE.

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of change 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.6.47 hd:enumSoftwareState

Used for the “state” data point of the “dmSoftware” ModuleClass.

Table 5.6.47-1 Interpretation of hd:enumSoftwareState

|  |  |  |
| --- | --- | --- |
| Value | Interpretation | Note |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| 1 | Inactive |  |
| 2 | Activating |  |
| 3 | Active |  |
| 4 | Deactivating |  |
|  |  |  |
|  |  |  |

### 5.6.xa hd:enumPackageState

Used for the “state” data point of the “dmPackage” ModuleClass.

Table 5.6.xa-1 Interpretation of hd:enumPackageState

|  |  |  |
| --- | --- | --- |
| Value | Interpretation | Note |
| 1 | NotInstalled |  |
| 2 | Downloaded |  |
| 3 | Installed |  |
| 4 | Downloading |  |
| 5 | Installing |  |
| 6 | Uninstalling |  |

### 5.6.xb hd:enumPackageType

Used for the “type” data point of the “dmPackage” ModuleClass.

Table 5.6.xb-1 Interpretation of hd:enumPackageType

|  |  |  |
| --- | --- | --- |
| Value | Interpretation | Note |
| 1 | SoftwareModule | Software module image (executable) |
| 2 | SoftwareLibrary | Software library file |
| 3 | WebContent | Web document |
| 4 | ConfigFile | Configuration file |
| 5 | VendorFile | Vendor-specific document |
| 6 | Undefined |  |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of change 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of change 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 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: Modules of flexNode model

|  |  |  |  |
| --- | --- | --- | --- |
| Module Instance Name | Module Class Name | Multiplicity | Description |
| dmAgent | dmAgent | 1 | See clause 5.8.3 |
| dmDeviceInfo | dmDeviceInfo | 0..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 |

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 2 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of change 3 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.8.3 dmAgent

This ModuleClass is the entry point module of [*flexNode*]; it provides capabilities to control and monitor the Device Management of the device.

Table 5.8.3-1 Actions of dmAgent ModuleClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return Type | Name | Arguments | Optional | Description |
| none  | reboot | rebootType: hd:enumRebootType | false | Execute a reboot or a factory reset |
| dmPackageId : M2MID | deployPackage | name: xs:stringversion: xs:stringurl: xs:url | true | Create a dmPackage |

The *deployPackage* action allows creating a new [dmPackage] module class (see clause 5.8.9), child of this dmAgent’s parent *flexNode*. The returned value is the ID of this created <flexContainer>. The created dmPackage is in NotInstalled state.

The DataPoints of dmAgent Module Class are as follows:

‘state’ represents the state of the agent for DM purposes (ready, sleeping, etc.).

some optional device properties which can be used for Device Management purpose. The dmAgent can be seen as a ‘dashboard’ that gathers common information such as battery level, memory or CPU usage…

Table 5.8.3-2 DataPoints of dmAgent ModuleClass

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Type | R/W | Optional | Unit | Description |
| state | hd:enumDmAgentState | R | false |  | The current state of the agent (ready, error, etc.) |
| storageAvailable | xs:integer | R | true | KB | The size of available storage memory. |
| storageTotal | xs:integer | R | true | KB | The size of total storage memory. |
| ramAvailable | xs:integer | R | true | KB | The size of available RAM memory. |
| ramTotal | xs:integer | R | true | KB | Total size of the RAM memory. |
| powerStatus | hd:enumPowerState | R | true |  | The status of the electrical power. |
| cpuUsage | xs:integer | R | true | % | Current CPU usage in percent. |
| systemTime | m2m:timestamp | RW | true |  | Reference time for the device.  |
| friendlyName  | xs:string | RW | true |  | The device friendly name.  |
| description | xs:string | RW | true |  | A human readable description of the device (e.g. Alice’s cell phone, kitchen’s fridge…) |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of change 3 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of change 4 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.8.7 dmSoftware

This ModuleClass provides DM capabilities to control and monitor software modules of the device.

An instance of this module class represents a software module hosted by the device.

A [dmSoftware] module is created on a Hosting CSE by the IPE in charge of the device, either at the initialization if it represents a software module that is pre-installed on the device, or after installation of one or more [dmPackage] modules (see clause 5.8.9) that have been dynamically created (for instance a software image with associated configuration files and libraries).

The association between one or more dmPackage modules and a dmSoftware module are under the responsibility of the IPE: dmSoftware modules are created, deleted or updated only by the IPE (for instance updating a dmPackage can trigger the modification of the *version* datapoint of an associated dmSoftware).

From external applications, [dmSoftware] modules can only be discovered from the parent [flexNode], not created, and afterwards they can only be activated / deactivated. They can be seen as ‘high level’ information (“there is such software that is running on the device”), whereas dmPackages are ‘low level’ information (“there is such executable file that is deployed on the device”).

Table 5.8.7-1 Actions of dmSoftware ModuleClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return Type | Name | Argument | Optional | Description |
| none | activate | none | true | Activate the software module. |
| none | deactivate | none | true | Deactivate the software module. |

Table 5.8.7-2 DataPoints of dmSoftware ModuleClass

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Type | R/W | Optional | Unit | Description |
| state | hd:enumSoftwareState | R | false |  | The current state of the software module (see clause 5.6.47). |
| name | xs:string | R | true |  | The name of the software module. |
| version | xs:string | R | true |  | The version of the software module. |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of change 4 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of change 5 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.8.9 dmPackage

This ModuleClass provides DM capabilities to deploy, control and monitor packages of the device.

* These packages can be simple resource files such as software libraries, configuration files, etc. In this case the *softwares* datapoint will be empty.
* They also can correspond to software images, in which case their installation will trigger the creation by the IPE of one or more [dmSoftware] SDT modules classes that can be activated / deactivated (see clause 5.8.7). In this case the *softwares* datapoint will contain the list of IDs of this(these) dmSoftware module(s).
* Instances of the dmPackage module class can be dynamically created by the *deployPackage* action of the dmAgent module class (see clause 5.8.2).

Table 5.8.7-1 Actions of dmPackage ModuleClass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return Type | Name | Argument | Optional | Description |
| none  | install | none | false | Download if needed and install the package. |
| none | uninstall | none | false | Uninstall the package. |
| none | update | version: xs:stringurl: xs:string | false | Update the package. |

Notes:

* The package can be pre-downloaded when the [dmPackage] resource is created.
* In the *update* action, the arguments *version* and *url* can be empty strings (case for instance of updating a package on a Linux-type system).
* When the [dmPackage] resource is deleted, the package shall be removed from the device.

Table 5.8.7-2 DataPoints of dmPackage ModuleClass

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Type | R/W | Optional | Unit | Description |
| type | hd:enumPackageType | R | false |  | The type of the package (software, library, config file, web content, etc. See clause 5.6.xb) |
| state | hd:enumPackageState | R | false |  | The current state of the package (see clause 5.6.xa) |
| name  | xs:string | R | true |  | The name of the package. |
| version  | xs:string | R | true |  | The version of the package. |
| url | xs:url | R | true |  | The URL from which the package can be downloaded |
| softwares | m2m:listOfM2MID | R | true |  | The list of dmSoftware modules, if any, that are associated with this dmPackage |

Notes:

* the dmPackage *name* and *version* datapoints are optional because they can be deduced from the downloaded resource. The *url* datapoint is optional because the package can be pre-installed or downloaded from a default repository (for instance a package on a Linux-type system).
* The possible dependencies between dmPackage modules (for instance the dmPackage of an executable software image depends on the deployment of other dmPackage that correspond to libraries needed by this software) is out of scope of this document.
* The control of the association between a dmPackage and an associated dmSoftware, for instance updating a dmPackage when the dmSoftware is active, is out of scope of this document.

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 5 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 6 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.2.4 Resource mapping for Action

Actions defined as part of a Device model or 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). The Action shall be triggered by updating at least one of the Arguments attributes with any value.
* 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 Device or 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.

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 6 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 7 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.3.2 Resource types

(…)

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*** |
| dmDataModelIO | ***dDMIO*** |
| dmDeviceInfo | ***dmDIo*** |
| dmEventLog | ***dmELg*** |
| dmFirmware | ***dmFie*** |
| dmPackage | ***dmPae*** |
| dmSoftware | ***dmSoe*** |
| 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*** |
| downChannel | ***dowCl*** |
| downVolume | ***dowVe*** |
| 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*** |
| upChannel | ***uphCl*** |
| update | ***updae*** |
| updateFirmware | ***updFe*** |
| upVolume | ***upoVe*** |
| writeIO | ***wriIO*** |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 7 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 8 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.3.3 Resource attributes for properties and data points

In protocol bindings resource attributes names for properties of module classes shall be translated into short names of Table 6.3.3‑1.

Table 6.3.3‑1: Resource attribute short names (ModuleClass properties)

|  |  |  |
| --- | --- | --- |
| Attribute Name | Occurs in | Short Name |
| chargingCapacity | electricVehicleConnector | ***chaCy*** |
| dischargingCapacity | electricVehicleConnector | ***disCy*** |
| electricEnergy | Battery | ***eleEy*** |
| material | Battery | ***matel*** |
| voltage | Battery | ***volte*** |

In protocol bindings resource attributes names for data points of module classes shall be translated into short names of Table 6.3.3‑2.

Table 6.3.3‑2: Resource attribute short names (ModuleClass data points)

|  |  |  |
| --- | --- | --- |
| Attribute Name | Occurs in | Short Name |
| absoluteEnergyConsumption | energyConsumption | ***abECn*** |
| absoluteStartTime | Timer | ***abSTe*** |
| absoluteStopTime | Timer | ***abST0*** |
| acousticStatus | acousticSensor | ***acoSs*** |
| adfStates | autoDocumentFeeder | ***adfSs*** |
| alarm | motionSensor, smokeSensor, temperatureAlarm, waterSensor | ***alarm*** |
| alarmStatus | alarmSpeaker | ***alaSs*** |
| altitude | geoLocation | ***altie*** |
| automode | airflow | ***autoe*** |
| availableChannels | televisionChannel | ***avaCs*** |
| basalMetabolism | bodyCompositionAnalyser | ***basMm*** |
| bath | hotWaterSupply | ***bath*** |
| batteryThreshold | Battery | ***batTd*** |
| blue | Colour | ***blue*** |
| bmi | bodyCompositionAnalyser | ***bmi*** |
| bodyLength | bodyCompositionAnalyser | ***bodLh*** |
| bone | bioElectricalImpedanceAnalysis | ***bone*** |
| brightness | Brightness | ***brigs*** |
| callerID | phoneCall | ***calID*** |
| callState | phoneCall | ***calSe*** |
| capacity | Battery | ***capay*** |
| ch2o | airQualitySensor | ***ch2o*** |
| channelId | televisionChannel | ***chaId*** |
| channelName | televisionChannel | ***chaNe*** |
| charging | Battery | ***charg*** |
| chargingCapacity | electricVehicleConnector | ***chaCy*** |
| co | airQualitySensor | ***co*** |
| co2 | airQualitySensor | ***co2*** |
| coarseness | Grinder | ***coars*** |
| code | faultDetection, filterInfo | ***code*** |
| coldWash | clothesWasherJobModeOption | ***colWh*** |
| colourSaturation | colourSaturation | ***colSn*** |
| component | dmFirmware | ***compt*** |
| concentration | Glucometer | ***concn*** |
| contextCarbohydratesAmount | Glucometer | ***coCAt*** |
| contextCarbohydratesSource | Glucometer | ***coCSe*** |
| contextExercise | Glucometer | ***conEe*** |
| contextHealth | Glucometer | ***conHh*** |
| contextLocation | Glucometer | ***conLn*** |
| contextMeal | Glucometer | ***conMl*** |
| contextMedication | Glucometer | ***conMn*** |
| contextTester | Glucometer | ***conTr*** |
| country | dmDeviceInfo | ***couny*** |
| cpuUsage | dmAgent | ***cpuUe*** |
| cupsNumber | Brewing | ***cupNr*** |
| current | energyConsumption | ***currt*** |
| currentAdfState | autoDocumentFeeder | ***cuASe*** |
| currentDate | Clock | ***curDe*** |
| currentJobMode | airConJobMode, airPurifierJobMode, clothesDryerJobMode, clothesWasherDryerJobMode, clothesWasherJobMode, cookerHoodJobMode, dehumidifierJobMode, dishWasherJobMode, robotCleanerJobMode, steamClosetJobMode | ***cuJMe*** |
| currentJobModeName | airConJobMode, airPurifierJobMode, clothesDryerJobMode, clothesWasherDryerJobMode, clothesWasherJobMode, cookerHoodJobMode, dehumidifierJobMode, dishWasherJobMode, robotCleanerJobMode, steamClosetJobMode | ***cJMNe*** |
| currentJobState | runState | ***cuJSe*** |
| currentMachineState | runState | ***cuMSe*** |
| currentPlayerMode | playerControl | ***cuPMe*** |
| currentPlayerModeName | playerControl | ***cPMNe*** |
| currentSecurityMode | securityMode | ***cuSMe*** |
| currentTemperature | Temperature | ***curT0*** |
| currentTime | Clock | ***curTe*** |
| currentTimeZone | Clock | ***cuTZe*** |
| currentValue | smokeSensor | ***crv*** |
| data  | dmEventLog | ***data*** |
| dataModelType | dmDataModelIO | ***daMTe*** |
| defaultValue | numberValue, textMessage | ***defVe*** |
| defrost | Refrigeration | ***defrt*** |
| description | faultDetection, dmAgent | ***dc*** |
| desiredHumidity | relativeHumidity | ***desHy*** |
| detectedTime | overcurrentSensor, smokeSensor | ***detTe*** |
| diastolicPressure | sphygmomanometer | ***diaPe*** |
| discharging | Battery | ***discg*** |
| dischargingCapacity | electricVehicleConnector | ***disCy*** |
| doorState | doorStatus | ***dooSe*** |
| duration | overcurrentSensor, recorder | ***dur*** |
| electricEnergy | Battery | ***eleEy*** |
| enabled | dmEventLog | ***enabd*** |
| energy | Pulsemeter | ***enery*** |
| estimatedTimeToEnd | Timer | ***eTTEd*** |
| extraRinse | clothesWasherJobModeOption | ***extRe*** |
| fat | bioElectricalImpedanceAnalysis | ***fat*** |
| fatFreeMass | bodyCompositionAnalyser | ***faFMs*** |
| filterLifetime | filterInfo | ***filLe*** |
| foamingStrength | Foaming | ***foaSh*** |
| frequency | energyConsumption | ***freqy*** |
| friendlyName | dmAgent | ***friNe*** |
| fwVersion | dmDeviceInfo  | ***fweVn*** |
| generationSource | energyGeneration | ***genSe*** |
| grainsRemaining | Grinder | ***graRg*** |
| green | Colour | ***green*** |
| hash | binaryObject | ***hash*** |
| hba1c | Glucometer | ***hba1c*** |
| heading | geoLocation | ***headg*** |
| headingAccuracy | geoLocation | ***heaAy*** |
| heatingLevel | heatingZone | ***heaLl*** |
| height | Height | ***heigt*** |
| horizontalAccuracy | geoLocation | ***horAy*** |
| horizontalDirection | airflow | ***horDn*** |
| hwVersion | dmDeviceInfo  | ***hweVn*** |
| impactDirectionHorizontal | impactSensor | ***imDHl*** |
| impactDirectionVertical | impactSensor | ***imDVl*** |
| impactLevel | impactSensor | ***impLl*** |
| impactStatus | impactSensor | ***impSs*** |
| impedance | bodyCompositionAnalyser | ***impee*** |
| jobModes | airConJobMode, airPurifierJobMode, clothesWasherDryerJobMode, clothesWasherJobMode, cookerHoodJobMode, dehumidifierJobMode, dishWasherJobMode, robotCleanerJobMode steamClosetJobMode,  | ***jobMs*** |
| jobStates | runState | ***jobSs*** |
| kcal | bioElectricalImpedanceAnalysis | ***kcal*** |
| keyNumber | Keypad | ***keyNr*** |
| latitude | geoLocation | ***latie*** |
| level | Battery | ***lvl*** |
| light | alarmSpeaker | ***light*** |
| liquidLevel | liquidLevel | ***liqLl*** |
| liquidRemaining | liquidRemaining | ***liqRg*** |
| lock | Lock | ***lock*** |
| loginName | Credentials | ***logNe*** |
| longitude | geoLocation | ***longe*** |
| loudness | acousticSensor | ***louds*** |
| lowBattery | Battery | ***lowBy*** |
| lqi | signalStrength | ***lqi*** |
| machineStates | runState | ***macSs*** |
| manufacturer | dmDeviceInfo | ***manur*** |
| manufacturerDetailsLink | dmDeviceInfo | ***maDLk*** |
| manufacturingDate | dmDeviceInfo | ***manDe*** |
| material | Battery | ***matel*** |
| maxHeatingLevel | heatingZone | ***maHLl*** |
| maxLength | textMessage | ***maxLh*** |
| maxLevel | openLevel | ***maxLl*** |
| maxSpeed | airflow | ***maxSd*** |
| maxValue | audioVolume, numberValue, ozoneMeter, temperature | ***maxVe*** |
| meanPressure | sphygmomanometer | ***meaPe*** |
| measuringScope | energyConsumption | ***meaSe*** |
| mediaID | mediaSelect | ***medID*** |
| mediaName | mediaSelect | ***medNe*** |
| mediaType | mediaSelect | ***medTe*** |
| memorySize | 3Dprinter | ***memSe*** |
| messageEncoding | textMessage | ***mesEg*** |
| minLength | textMessage | ***minLh*** |
| minLevel | openLevel | ***minLl*** |
| minSpeed | airflow | ***minSd*** |
| minValue | numberValue, temperature | ***minVe*** |
| modality | Pulsemeter | ***moday*** |
| model | dmDeviceInfo | ***model*** |
| monitoringEnabled | airQualitySensor | ***monEd*** |
| multiFirmware | dmFirmware | ***mulFe*** |
| multiplyingFactors | energyConsumption, energyGeneration | ***mulFs*** |
| muscle | bioElectricalImpedanceAnalysis | ***musce*** |
| muscleMass | bodyCompositionAnalyser | ***musMs*** |
| muteEnabled | audioVolume | ***mutEd*** |
| name | dmPackage, dmSoftware | ***name*** |
| network | 3Dprinter | ***netwk*** |
| numberValue | numberValue | ***numVe*** |
| object | binaryObject | ***objet*** |
| objectType | binaryObject | ***objTe*** |
| openAlarm | doorStatus | ***opeAm*** |
| openDuration | doorStatus | ***opeDn*** |
| openLevel | openLevel | ***opeLl*** |
| osVersion | dmDeviceInfo | ***oseVn*** |
| overcurrentStatus | overcurrentSensor | ***oveSs*** |
| oxygenSaturation | Oximeter | ***oxySn*** |
| ozoneStatus | ozoneMeter | ***ozoSs*** |
| ozoneValueMG | ozoneMeter | ***ozVMG*** |
| ozoneValuePPM | ozoneMeter | ***oVPPM*** |
| password | Credentials | ***pwd*** |
| power | energyConsumption | ***power*** |
| powerGenerationData | energyGeneration | ***poGDa*** |
| powerSaveEnabled | powerSave | ***poSEd*** |
| powerState | binarySwitch | ***powSe*** |
| powerStatus | dmAgent | ***powSs*** |
| presentationURL | dmDeviceInfo | ***prURL*** |
| previousChannel | televisionChannel | ***preCl*** |
| preWash | clothesWasherJobModeOption | ***preWh*** |
| primaryName | dmFirmware | ***priNe*** |
| primaryState | dmFirmware | ***priSe*** |
| primaryUrl | dmFirmware | ***priUl*** |
| primaryVersion | dmFirmware | ***priVn*** |
| printingState | printQueue | ***priSe*** |
| printSizeX | 3Dprinter | ***priSX*** |
| printSizeY | 3Dprinter | ***priSY*** |
| printSizeZ | 3Dprinter | ***priSZ*** |
| printType | 3Dprinter | ***priTe*** |
| progressPercentage | runState | ***proPe*** |
| pulseRate | Pulsemeter | ***pulRe*** |
| pushed | pushButton | ***pushd*** |
| ramAvailable | dmAgent | ***ramAe*** |
| ramTotal | dmAgent | ***ramTl*** |
| rapidCool | Refrigeration | ***rapCl*** |
| rapidFreeze | Refrigeration | ***rapFe*** |
| recipientID | phoneCall | ***recID*** |
| red | Colour | ***red*** |
| referenceTimer | Timer | ***refTr*** |
| relativeHumidity | relativeHumidity | ***relHy*** |
| remoteControlEnabled | remoteControlEnable | ***reCEd*** |
| resistance | bioElectricalImpedanceAnalysis | ***resie*** |
| roundingEnergyConsumption | energyConsumption | ***roECn*** |
| roundingEnergyGeneration | energyGeneration | ***roEGn*** |
| rr | Pulsemeter | ***r0*** |
| rssi | signalStrength | ***rssi*** |
| runningTime | Timer | ***runTe*** |
| sdp | sessionDescription | ***sdp*** |
| secondaryName | dmFirmware | ***secNe*** |
| secondaryState | dmFirmware | ***secSe*** |
| secondaryUrl | dmFirmware | ***secUl*** |
| secondaryVersion | dmFirmware | ***secVn*** |
| securityModes | securityMode | ***secMs*** |
| sensitivity | motionSensor | ***sensy*** |
| sensorHumidity | airQualitySensor | ***senHy*** |
| sensorOdor | airQualitySensor | ***senOr*** |
| sensorPM1 | airQualitySensor | ***sePM1*** |
| sensorPM10 | airQualitySensor | ***sePM0*** |
| serialNumber | dmDeviceInfo | ***serNr*** |
| sensorPM2 | airQualitySensor | ***sePM2*** |
| significantDigits | energyConsumption, energyGeneration | ***sigDs*** |
| silentTime | motionSensor | ***silTe*** |
| size | binaryObject | ***size*** |
| smokeThreshhold | smokeSensor | ***smoTd*** |
| softLeanMass | bodyCompositionAnalyser | ***soLMs*** |
| soilLevel | clothesWasherJobModeOption | ***soiLl*** |
| speed | airFlow | ***speed*** |
| speedFactor | playerControl | ***speFr*** |
| speedWash | clothesWasherJobModeOption | ***speWh*** |
| spinLevelStrength | spinLevel | ***spLSh*** |
| spinSpeed | clothesWasherJobModeOption | ***spiSd*** |
| startPause | operationMode | ***staPe*** |
| state | dmAgent, dmPackage, dmSoftware | ***state*** |
| status | boiler, dmEventLog, electricVehicleConnector, faultDetection, filterInf, mediaSelect | ***sus*** |
| steamTreat | clothesWasherJobModeOption | ***steTt*** |
| step | numberValue | ***step*** |
| stepValue | audioVolume, openLevel, temperature | ***steVe*** |
| storageAvailable | dmAgent | ***stoAe*** |
| storageTotal | dmAgent | ***stoTl*** |
| strength | brewing | ***streh*** |
| subModel | dmDeviceInfo | ***subMl*** |
| supportedHorizontalDirection | airFlow | ***suHDn*** |
| supportedMediaSources | mediaSelect | ***suMSs*** |
| supportedMessageValues | textMessage | ***suMVs*** |
| supportedPlayerModes | playerControl | ***suPMs*** |
| supportedVerticalDirection | airFlow | ***suVDn*** |
| supportURL | dmDeviceInfo | ***suURL*** |
| swVersion | dmDeviceInfo | ***sweVn*** |
| systemTime | dmAgent | ***sysTe*** |
| systolicPressure | sphygmomanometer | ***sysPe*** |
| targetAltitude | geoLocation | ***tarAe*** |
| targetDuration | timer | ***tarDn*** |
| targetLatitude | geoLocation | ***tarLe*** |
| targetLongitude | geoLocation | ***tarL0*** |
| targetTemperature | temperature | ***tarTe*** |
| targetTimeToStart | timer | ***tTTSt*** |
| targetTimeToStop | timer | ***tTTSp*** |
| temperature | temperatureAlarm | ***tempe*** |
| temperatureThreshhold | temperatureAlarm | ***temTd*** |
| textMessage | textMessage | ***texMe*** |
| time | keepWarm | ***time*** |
| token | credentials | ***tk*** |
| tone | alarmSpeaker | ***tone*** |
| turboEnabled | turbo | ***turEd*** |
| type | dmEventLog, dmPackage | ***type*** |
| unit | temperature | ***unit*** |
| uri | printQueue | ***ur0*** |
| url | sessionDescription, dmPackage | ***ur1*** |
| useGrinder | grinder | ***useGr*** |
| uvStatus | uvSensor | ***uvtSs*** |
| uvValue | uvSensor | ***uvaVe*** |
| version | dmPackage, dmSoftware | ***versn*** |
| verticalAccuracy | geoLocation | ***verAy*** |
| verticalDirection | airFlow | ***verDn*** |
| visceraFat | bioElectricalImpedanceAnalysis | ***visFt*** |
| voc | airQualitySensor | ***voc*** |
| voltage | battery | ***volte*** |
| voltage | energyConsumption | ***volte*** |
| volumePercentage | audioVolume | ***volPe*** |
| washTemp | clothesWasherJobModeOption | ***wasTp*** |
| water | bioElectricalImpedanceAnalysis | ***water*** |
| waterFlowStrength | waterFlow | ***waFSh*** |
| weight | weight | ***weigt*** |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 8 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of Change 9 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.3.4 Resource attributes for actions arguments and return values

In protocol bindings resource attributes names for arguments of actions shall be translated into short names of Table 6.3.4-1.

Table 6.3.4‑1: Resource attribute short names (Action arguments)

|  |  |  |
| --- | --- | --- |
| Argument Name | Occurs in | Short Name |
| address | readIO, writeIO | ***addrs*** |
| name | deployPackage | ***name*** |
| payload | writeIO | ***payld*** |
| rebootType | reboot | ***rebTe*** |
| url | deployPackage, updateFirmware, update | ***url*** |
| version | deployPackage, updateFirmware, update | ***versn*** |

In protocol bindings resource attributes names for returned values of actions shall be translated into short names of Table 6.3.4-2.

Table 6.3.4‑2: Resource attribute short names (Action return values)

|  |  |  |
| --- | --- | --- |
| Returned Value Name | Occurs in | Short Name |
| result | readIO, writeIO | ***resut*** |
| dmPackageId | deployPackage | ***dmPId*** |

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of Change 9 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*