

Work Item	Work Item
Work Item Title:	IPE-based Device Management with FlexContainers
Document Number	WI-0109
Supporting Members or Partner type 2	Orange, Hansung University, Exacta GSS, Deutsche Telekom, Nokia
Date:	2022-02-17
Abstract:	Propose a work item for Device Management (DMG) with IPE-based approach with FlexContainers
'Template Version: January 2019 (do not modify)	'Template Version: January 2019 (do not modify)

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1 Title (abbreviation)

IPE-based Device Management with FlexContainers (IPE-DM)

2 Justification

In Release 4, SDT (Smart Device Template) (WI-0081) was extended to include device management functions in addition to the existing services. This justified extension creates a new way to perform device management compared to the existing Device Management (DMG) Common Service Function (CSF) model using <mgmtObj>.

In Release 4, a work item (WI-0099) was created to study a possible transition phase allowing implementation using DMG <mgmtObj> to migrate towards SDT model. The study done in TR-0067 concluded that such a migration was not desirable and thus, DMG <mgmtObj> should stay as is.

The WI-0099 study raised a new vision on the way the Device Management could be designed, especially for IoT network technologies, with more abstract APIs and independently from any external DM technology, relying on IPE guidelines. This new vision is driven by the extension of the Edge architectural paradigm, from Edge in network equipments to Extreme Edge Computing in IoT devices, able to host more and more powerful processing. This leads to potentially highly distributed deployment which need to reconsider some initial architectural thoughts.

Device Management using flexContainers (IPE-based) with SDT provides a unique and extensible solution to manage IoT devices for services and device

management. This unicity will help to develop solutions using AI within architectures that may be extended when a solution is upgraded for new needs but also to include new kinds of devices which do not exist today.

The IPE-based Device Management with FlexContainers (IPE-DM) offers:

- A simplified architecture: one IPE per interworked technology, not a global CSF for the CSE to handle all external technologies.
- A simplified data model: no need to describe in each managed entity the full information on its origin.
- A simplified design: only <flexContainers>, not <mgmtObj> + <mgmtCmd>. FCs (flexContainers) are more flexible than MOs (FCs can have FC children).
- A simplified usage: unified Service & Device Management.
- An historization of DM events through flexContainerInstances.

While the current DMG CSF:

- Was designed before the creation of the <flexContainer> resource (release 2).
- Is not documented to the level required for the test purposes.
- Is designed in a way that it is the CSE that manages MOs, hence it has to ‘know’ the underlying DM protocols: not suited for the explosion of IoT protocols (in the proposed IPE-based DM, the ‘intelligence’ is in the IPEs, not in the CSE).
- Is designed for ‘real’ DM protocols (BBF TR-069, OMA DM & LwM2M), not for interworking with IoT networks that have few ‘pure DM’ features.

This Release 5 Work Item proposes to define an IPE-based Device Management with FlexContainers that will be more future-proof and applicable to any kind of existing or future IoT networks.

This work item will specify the IPE-based Device Management with FlexContainers to cover at least the existing functional scope of device management features that are:

- the basic management features (including BBF TR-069, OMA DM & LwM2M),
- the CMDH (Communication Management and Delivery Handling) and
- the Field Device Configuration.

3 Intended Output

Tick all the appropriate cases

Check	Case
X	Change request(s) to existing Technical Specification(s)
X	Change request(s) to existing Technical Reports(s)

Check	Case
X	New Normative Technical Specifications(s) New Permanent Technical Reports(s) New Temporary Technical Reports(s)

4 Impact

4.1 oneM2M Work Items

None

5 Scope

The scope of the Work Item is to specify the IPE-based Device Management with FlexContainers (IPE-DM)

6 Schedule and impacted specifications

Provide the schedule of tasks to be performed;

6.1 New Specifications (if any)

Document Type	Document Number*	Document Title	Schedule				Lead WG	Impacted WGs	Comments
			Schedule (TP No.) Start	Schedule (TP No.) Change Control	Schedule (TP No.) Freeze	Schedule (TP No.) Approval			
TR									

* The first versions will be assigned by the secretariat (WPM Secretary)

6.2 CRs to existing specifications (if any)

Impacted TS/TR	CR number (when known)	Subject of the CR	Approved at plenary#	Impacted WGs	Comments
TS-0001, TS-0004		Allow [flexNode] child to <node>, Add flex- Container based CMDH		SDS	
TS-0003, TS-0022		Extend to include Device Field Con- figuration with the IPE-based DM		SDS	
TS-0005, TS-0006, TS-0014, TR-0035		Extend to include in- terworking with the IPE-based DM		SDS, RDM	
TS-0026		Extend to include CMDH with the IPE-based DM		SDS	
TS-0033		Extend to include DM basic features		RDM	
TR-0039		Developer guide for IPE-based DM		TDE	

Impacted TS/TR	CR number (when known)	Subject of the CR	Approved at plenary#	Impacted WGs	Comments
TS-0021, TS-0024, TS-0030, TS-0035, TS-0040, TR-0042, TR-0064, TR-0065		Extend the inter- working specifica- tions with reference to the IPE-based DM		RDM, SDS	

7 Work Item Rapporteur(s)

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8 History

Document history

Version	Date	Description
V0.0.1	2021-11-22	Initial proposal
V0.0.1	2021-12-06	Uploaded following agreement of TP-2021-0078R02
V0.0.2	2022-02-17	Updated after decision to not create a new TS but keep the IPE-based DM in TS-0023 and add the basic features to TS-0033.