RESTful Network API for Twinning Devices Requirements

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Open Mobile Alliance
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1. Scope (Informative)

This document defines the requirements for OMA RESTful Network API for Twinning Devices.

2. References

2.1 Normative References

[Autho4API_10]	"Authorization Framework for Network APIs", Open Mobile Alliance™, OMA-ER-Autho4API-V1_0, URL: http://www.openmobilealliance.org/
[JSON]	JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999.
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

[OMADICT]	"Dictionary for OMA Specifications", Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_9, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1   Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except "Scope" and "Introduction", are normative, unless they are explicitly indicated to be informative.

3.2   Definitions

3.3   Abbreviations

API	Application Programming Interface
HTTP	HyperText Transfer Protocol
JSON	JavaScript Object Notation
MNO	Mobile Network Operator
MSISDN	Mobile Subscriber ISDN Number
OMA	Open Mobile Alliance
REST	REpresentational State Transfer
SP	Service Provider
URL	Uniform Resource Locator
XML	eXtensible Markup Language

4. Introduction (Informative)

This API provides methods that enable a secondary device (e.g. a wearable) to be twinned with a primary mobile device and hence share the identity of the primary device.

4.1 Version 1.0

The OMA_RD_REST_NetAPI_Twin_V1.0 captures the functional requirements scoping the set of APIs exposing twinning functionality to an application residing on a secondary device (e.g. a wearable) or a primary mobile device.

5. RESTful Network API for Twinning Devices release description (Informative)

5.1 End-to-end Service Description

The REST_NetAPI_Twin V1.0 addresses an important field of open service creation by allowing access to Twinning Devices feature, thus enabling service creation via advanced applications in order to decrease significantly the Time-to-Market for new services.

6. Requirements   (Normative)

6.1 High-Level Functional Requirements

6.1.1 Common

Label	Description	Release
HLF-CM-001	The Network API for Twinning Devices SHALL support HTTP/REST.	REST_NetAPI _Twinning-V1.0
HLF- CM-002	Resource URLs and primitives names SHALL have an intuitive relationship with the functions and resources they are intended to represent.	REST_NetAPI _Twinning-V1.0
HLF- CM-003	The RESTful Network API for Twinning Devices SHALL allow the inclusion of API version in the resource URLs.	REST_NetAPI _Twinning-V1.0
HLF- CM-004	The RESTful Network API for Twinning Devices SHALL expose a functional abstraction at the user level rather than at the level of underlying protocols.	REST_NetAPI _Twinning-V1.0
HLF- CM-005	The RESTful Network API for Twinning Devices SHALL support "server"-based application clients and "device"-based application clients. Instantiation examples include applications running on a Web server (where the user interacts with the application via a web browser), or running on a mobile or fixed device as a "widget" or as a native application.	REST_NetAPI _Twinning-V1.0
HLF- CM-006	In order to provide controlled access to Twinning Devices functionality, the RESTful Network API for Twinning Devices SHALL support appropriate authorization mechanisms and Service Provider policies.	REST_NetAPI _Twinning-V1.0

Table 1: High-Level Functional Requirements – Common requirements

6.1.2 Primary Device API

Label	Description	Release
HLF-PD-001	The RESTful Network API for Twinning Devices SHALL enable an application to request activation of Twinning relationship from the primary device.	REST_NetAPI _Twinning V1.0
HLF-PD-002	The RESTful Network API for Twinning Devices SHALL enable an application to request toggling (On/Off) Twinning feature from the primary device.	REST_NetAPI _Twinning V1.0
HLF-PD-003	The RESTful Network API for Twinning Devices SHALL support the retrieval of the list of Twinned (secondary) devices and their associated Twinning status (On/Off). The API SHOULD support the identification of Twinned Secondary devices by their MSISDNs in addition to user-chosen (or system-generated) unique names (e.g. my-car, my-watch).	REST_NetAPI _Twinning V1.0
HLF- PD-004	The RESTful Network API for Twinning Devices SHALL support Twinning relationship deactivation of a currently active Twined device from the primary device. Note: As a result of the Twinning deactivation, the twinning association between the primary and the secondary device is removed permanently (i.e. the secondary device no longer is in the list of Twinned devices for a given primary device) and the Twinning access permission is revoked.	REST_NetAPI _Twinning V1.0

HLF-PD-005	The RESTful Network API for Twinning Devices SHALL support Toggle, query and deactivation operations from the primary device.	REST_NetAPI _Twinning V1.0
HLF-PD-006	The RESTful Network API for Twinning Devices SHALL support a primary device having multiple twinned secondary devices.	REST_NetAPI _Twinning V1.0
HLF-PD-007	The RESTful Network API for Twinning Devices SHALL support Toggle notification to the primary device when Toggle operation is invoked by the secondary device and successfully taken effect in the network.	REST_NetAPI _Twinning V1.0

Table 2: High-Level Functional Requirements – Primary Device

6.1.3   Secondary Device API

Label	Description	Release
HLF-SD-001	The RESTful Network API for Twinning Devices SHALL enable an application to request a Twinning relationship activation authorization code from the secondary device.	REST_NetAPI _Twinning V1.0
HLF-SD-002	The Twinning activation authorization code request MAY optionally provide the identity of the Primary device's MNO (e.g. the user is asked to identify the Primary device's MNO from a predefined list displayed on Secondary device). Note: This enables the secondary device MNO the option of interacting with the primary device MNO and request an activation code which would then be passed to the secondary device in the reply to the Twinning activation authorization code request.	REST_NetAPI _Twinning V1.0
HLF-SD-003	The Twinning activation message response SHALL at a minimum contain two separate parameters: 1. An activation authorization code (e.g. a six-digit code) 2. Identity (e.g. MCC/MNC) of the MNO which generated the activation authorization code. This is mainly to support inter-MNO Twinning use cases.	REST_NetAPI _Twinning V1.0
HLF-SD-004	The RESTful Network API for Twinning Devices SHALL enable an application to request toggling (On/Off) Twinning feature from an actively Twinned secondary device.	REST_NetAPI _Twinning V1.0
HLF-SD-005	The RESTful Network API for Twinning Devices SHALL support providing the required authorization (e.g. OAuth Twinning access token) for Toggle, Twinning status query and deactivation operations to the secondary device.	REST_NetAPI _Twinning V1.0
HLF-SD-006	The RESTful Network API for Twinning Devices SHALL enable the secondary device to query its own Twinning status. The response to query status SHALL contain the identity of the primary device to which the secondary device is currently Twinned with in addition to the Twinning status (On/Off).	REST_NetAPI _Twinning V1.0
HLF-SD-007	The RESTful Network API for Twinning Devices SHALL support Twinning relationship deactivation of a currently active Twined device from the secondary device. Note: As a result of the Twinning deactivation, the twinning association between the primary and the secondary device is removed permanently (i.e. the secondary device no longer is in the list of Twinned devices for a given primary device) and the Twinning access token is expired.	REST_NetAPI _Twinning V1.0

HLF-SD-008	The RESTful Network API for Twinning Devices SHALL support Toggle notification to the secondary device when Toggle operation is invoked by the primary device and successfully taken effect in the network.	REST_NetAPI _Twinning V1.0
HLF-SD-009	The RESTful Network API for Twinning Devices SHALL support providing the required authorization (e.g. OAuth access token) to the secondary device to enable it to directly communicate with the Primary's network for the purpose of using primary's device services (e.g. send/receive messages on behalf of the Primary device).	REST_NetAPI _Twinning V1.0

Table 3: High-Level Functional Requirements – Secondary Device

6.1.4   Twinning Enabler

Label	Description	Release
HLF-TE-001	The Twinning association between a primary device and the secondary device(s) SHALL persist in the Twinning Enabler.	REST_NetAPI _Twinning V1.0
HLF- TE-002	As the primary or a secondary device toggle (On/Off) twinning feature, the Twinning status change SHALL persist in the Twinning Enabler.	REST_NetAPI _Twinning V1.0
HLF-TE-003	Toggling off the Twinning feature SHALL NOT cause the termination of the twinning relationship.	REST_NetAPI _Twinning V1.0
HLF-TE-004	Twinning deactivation for a given secondary device SHALL cause the termination of the twinning relationship. Note: The Twinning deactivation operation SHALL also cause the expiry of the Twinning access token.	REST_NetAPI _Twinning V1.0
HLF- TE-005	The Twinning activation authorization code as generated by the server (i.e. Twinning Enabler) SHALL be a one-time use only and SHALL expire within a prescribed period of time as defined by the server policy.	REST_NetAPI _Twinning V1.0
HLF- TE-006	If the Primary's MNO identity is available in the authorization code request, it SHALL be used by the secondary's MNO to interact with the Primary's MNO to retrieve an activation authorization code. Otherwise, the activation authorization code SHALL be generated by the Secondary's network operator itself.	REST_NetAPI _Twinning V1.0
HLF- TE-007	The user SHALL be allowed to provide any name of his/her choosing (e.g. my-watch, my-blue-car, etc.) as part of the Twinning activation process initiated from the primary device. If the user does not provide a name, the Twinning Enabler SHALL provide a default name.	REST_NetAPI _Twinning V1.0
HLF- TE-008	The Twinning enabler SHALL not allow a secondary device to become itself a Primary device to other secondary devices. That is, a secondary device SHALL only be allowed to be in a single Twinning relationship. In addition a Primary device SHALL not be allowed to become a secondary device in another Twinning relationship.	REST_NetAPI _Twinning V1.0
HLF-TE-009	The Twinning enabler SHALL ensure that a secondary device has only one Twinning relationship at a time.	REST_NetAPI _Twinning V1.0

Table 4: High-Level Functional Requirements –Twinning Enabler

6.1.5   Inter-MNO Twinning API

Label	Description	Release
HLF-IC-001	The Twinning between a primary device from one MNO and a secondary device from a different MNO SHALL be supported by the RESTful Network API for Twinning Devices. .	REST_NetAPI _Twinning V1.0
HLF-IC-002	The RESTful Network API for Twinning Devices SHALL enable a MNO request Twinning activation authorization code from another MNO.	REST_NetAPI _Twinning V1.0
HLF-IC-003	The RESTful Network API for Twinning Devices SHALL enable a MNO respond to the Twinning activation authorization code request invoked by another MNO. The response SHALL support requirement HLF-SD-003.	REST_NetAPI _Twinning V1.0
HLF-IC-004	The RESTful Network API for Twinning Devices SHALL enable a MNOto request Twinning activation of a secondary device served by another MNO. Inter-MNO Twinning Activation API SHALL expose the primary device's identifier (e.g. MSISDN) to the secondary device's MNO. This is to ensure appropriate information is available to the secondary device's MNO to provision its network accordingly	REST_NetAPI _Twinning V1.0
HLF-IC-005	The RESTful Network API for Twinning Devices SHALL enable a MNOperform inter-MNO Twinning Toggle operation towards another MNO. That is a Toggle operation invoked by a secondary device on MNO "A" network can propagate to MNO "B" and vice versa.	REST_NetAPI _Twinning V1.0
HLF-IC-006	The RESTful Network API for Twinning Devices SHALL enable the two MNO exchange appropriate information (e.g. access tokens, messaging resources endpoints/URLs) for example to enable a Twinned secondary device to directly receive messages from the Primary's network and also be able to sync with Primary's Network Message Storage (NMS).	REST_NetAPI _Twinning V1.0
HLF-IC-007	The RESTful Network API for Twinning Devices SHALL support propagation of Toggle notification from one MNO to another. When Toggle operation is initiated and successfully taken effect in one MNO network, if the device initiating the Toggle operation is in a Twinning relationship with a device served by another MNO then the propagation of the Toggle notification SHALL be made available by the MNO.	REST_NetAPI _Twinning V1.0

Table 5: High-Level Functional Requirements –Inter-MNO Twinning

6.1.6   Security

It is expected to be possible for a service provider to deploy developer security mechanisms and engagement/registration processes aimed to individual developers. Developer security mechanisms are out of the scope of this document.

6.1.6.1   Authentication

Application authentication and User authentication are out of scope.

6.1.6.2   Authorization

Label	Description	Release
OAU-001	The RESTful Network API for Twinning Devices SHOULD support application authorization based on [Autho4API_10].	REST_Net API_Twin-V1.0
OAU-002	Appropriate OAuth "scope" value for Twinning feature SHALL be defined.	REST_Net API_Twin-V1.0

Table 6: High-Level Functional Requirements – Authorization Items

6.1.6.3   Data Integrity

Data Integrity is out of scope.

6.1.6.4   Confidentiality

Confidentiality is out of scope.

6.1.7   Charging Events

Charging events are out of scope.

6.1.8   Administration and Configuration

Administration and configuration are out of scope.

6.1.9   Usability

Usability is out of scope.

6.1.10   Interoperability

Not applicable.

6.1.11   Privacy

Privacy is out of scope.

6.2   Overall System Requirements

Overall system requirements are out of scope.

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2   Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD-REST_NetAPI_Twinning-V1_0	25 Oct. 2014	All	First baseline
	04 Nov 2014	All	Incorporates CR OMA-ARC-TWIN-2014-0006R02-CR_Progress_RD
	18 Nov 2014	6.x	Incorporates OMA-ARC-TWIN-2014-0009R01-CR_Additional_req_and_cleanups
	23 Jan 2015	6.x	Incorporates OMA-RD-REST_NetAPI_Twinning-V1_0-20141118-D_CR05R01
	17 Mar 2015	6.x	Incorporates OMA-ARC-TWIN-2015-0017-CR_RD_Review_resolution
Candidate Version OMA-RD-REST_NetAPI_Twinning-V1_0	07 Apr 2015	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2015-0074-INP_TWIN_V1_0_RD_for_Candidate_approval

Appendix B.   Use Cases   (Informative)

B.1   Typical use case – Twin a Wearable to Primary Mobile Device

B.1.1   Short Description

This use case provides users with the capability to twin a wearable (e.g. watch) or a connected car to his/her primary mobile device.

This would result in the user receiving voice calls and text messages on the wearable or on the car while the destination for the call/text was the primary device. Also, depending on the capability of the wearable/car, the user may originate voice calls or text messaging while the user at the destination would see the call/text originated from the originating user's primary device.

Use case description:

1. Tom is a subscriber to the Twinning feature.

2. Tom initiates Twinning activation request from his primary mobile device.

3. Once Tom is authenticated and authorization of the Twinning operation is granted, Tom is being told on the screen of his primary device (by the API Gateway or a backend system) that he needs to enter a valid Twinning code and the instruction as to how to obtain a valid Twinning code is also displayed

4. Tom follows the instruction and initiate a request for a Twinning code from his secondary device (e.g., wearable watch or car display)

5. API Gateway returns a valid Twinning code to Tom's secondary device which is displayed to Tom

6. Tom sees the Twinning code and enters the Twinning code into the Twinning activation screen of the primary device (which is waiting for Tom enter the code and press "continue")

7. API gateway in conjunction with the authorization server and Twinning Enabler validates the access token and the Twinning code and sets up the appropriate Twinning association between the primary device and secondary device in the Twinning Enabler. The Twinning status between the primary and the secondary device is set to "On" by default upon Twinning activation operation

8. API gateway provides different OAuth access tokens to both applications on the primary and secondary devices for subsequent operations when/if needed (e.g. Toggle Twinning feature).

B.1.2   Market benefits

- Use of RESTful Network API in general would lower the usage barrier for developers from the Internet domain, supporting the Web 2.0 consumers.

- Use of a standard RESTful Network API would benefit device vendors by providing a common way of interacting with any operator's network to activate Twinning on secondary devices such as wearables, connected cars, etc.