A Uniform Resource Name Namespace for the Device Identity and the Mobile Equipment Identity (MEID)
draft-atarius-dispatch-meid-urn-18

Abstract

This document defines a Uniform Resource Name (URN) namespace for the Third Generation Partnership Project 2 (3GPP2) and a Namespace Specific String (NSS) for the Mobile Equipment Identity (MEID). The structure of an MEID is 15 hexadecimal digits long and is defined in the Third Generation Partnership Project 2 (3GPP2) (see [S.R0048-A]) to uniquely identify each individual mobile equipment (e.g., a handset or mobile phone). The 3GPP2 has a requirement to be able to use an MEID as a URN. This document fulfills that requirement.

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1. Introduction

A single mode 3GPP mobile equipment which uses only 3GPP technology to transmit and receive voice or data, or a dual mode 3GPP/3GPP2 mobile equipment which uses either 3GPP or 3GPP2 technology to transmit and receive voice or data has an International Mobile station Equipment Identity (IMEI) to identify the mobile equipment. A URN Namespace and an NSS for the IMEI are defined in [RFC7254]. For cases where the mobile equipment uses IMEI as an identity for
dual mode 3GPP/3GPP2 access the IMEI urn as defined in [RFC7254] can be used to identify the mobile equipment.

However, single mode 3GPP2 mobile equipment which supports only 3GPP2 access technology to transmit and receive voice or data has a hexadecimal MEID. Since there are fundamental differences between MEID and IMEI, i.e. in encoding, format and the ownership, [RFC7254] cannot be employed to represent the hexadecimal MEID.

This document specifies a URN namespace for 3GPP2 and an NSS for the MEID as per the namespace registration requirement in [RFC8141]. The structure of an MEID is 15 hexadecimal encoded digits long and is defined by 3GPP2 (see [S.R0048-A]) to uniquely identify each individual mobile equipment (e.g., a handset or mobile phone). The 3GPP2 has a requirement to be able to use an MEID as a URN. This document fulfills that requirement. The Namespace Identifier (NID) ‘3gpp2’ is for identities used in 3GPP2 networks. The MEID is managed by the 3GPP2, so this NID is managed by the 3GPP2. This specification defines only NSSs constructed from MEIDs under the ‘3gpp2’ NID. These NSSs start with "meid:" in order to identify them as such. Additional types of NSS under the ‘3gpp2’ NID may be specified in the future by the 3GPP2 via additional specifications.

The MEID is 15 hexadecimal digits long and includes a manufacturer code of 8 hexadecimal digits and the serial number of 6 hexadecimal digits plus a hexadecimal digit as a check digit.

The manufacturer code identifies the mobile equipment manufacturer. A manufacturer can be assigned more than one manufacturer code. The serial number uniquely identifies each mobile equipment within the manufacturer code. The check digit is used as assurance of integrity in error-prone operations, e.g. when used with certain types of readers during inventory management operations. The check digit is not transmitted. Therefore the first 14 of the 15 hexadecimal digits are used for defining the MEID as a URN.

The information here is meant to be a concise guide for those wishing to use the hexadecimal MEID as a URN. Nothing in this document should be construed to override [S.R0048-A] that defines the MEID.

2. Terminology

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].
3. Namespace Registration Template

A completed namespace registration follows.

3.1. Namespace ID

‘3gpp2’ requested

3.2. Version

1

3.3. Date

2018-06-10

3.4. Registrant

Standards Organization: Third Generation Partnership Project 2 (3GPP2)

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3.5. Purpose

The ‘3gpp2’ namespace is used to identify mobile equipment which uses technologies defined by the Third Generation Partnership Project 2 (3GPP2); initially such equipment is identified by a URN that embeds a Mobile Equipment Identity (MEID) that is 15 hexadecimal digits long and unique to each individual mobile equipment (e.g., a handset or mobile phone).

3.6. Syntax

The identifier is expressed in American Standard Code for Information Interchange (ASCII) characters and has a hierarchical expression using the Augmented Backus-Naur Form (ABNF) defined in [RFC5234], as follows:
pp2-urn = "urn:" pp2-NID ":" pp2-NSS
pp2-NID = "3gpp2"
pp2-NSS = meid-specifier / future-pp2-specifier
meid-specifier = "meid:" meidval
future-pp2-specifier = future-specifier *[ ":" 1* pchar /"/
]future-specifier = 1*pp2-char
pp2-char = ALPHA / DIGIT / "-" / "." / ";" / pct-encoded

where 'pchar' and 'pct-encoded' are defined in [RFC3986]. An NSS for the MEID is defined under the '3gpp2' NID.

The representation of the MEID is a specific number of hexadecimal digits, as described in [S.R0048-A].

The formal definition of a URN with 'meid' NSS contains one meidval with the formal definition according to the following ABNF [RFC5234]:

meidval = Manufacturer-Code "-" Serial-Number
Manufacturer-Code = 8HEX
Serial-Number = 6HEX
HEX = DIGIT / "A" / "B" / "C" / "D" / "E" / "F"

3.7. Assignment

The Manufacturer Code and Serial Number portions of the MEID are permanently stored in the mobile equipment so they remain persistent as long as the mobile equipment exists. The process for Manufacturer Code and Serial Number assignment is documented in [SC.R4002-0] and the Manufacturer Code and Serial Number values once assigned are not re-assigned to other mobile equipments.

Identifiers in the '3gpp2' namespace are defined and assigned by the 3GPP2 or an agency appointed by 3GPP2 after ensuring that the URNs to be assigned are unique. Procedures are in place to ensure that each MEID is uniquely assigned by the mobile equipment manufacturer so that it is guaranteed to uniquely identify that particular mobile equipment.

3.8. Security and Privacy

See Section 8 of RFC XXXX.

3.9. Interoperability

Although both the 3GPP2 Mobile Equipment Identity (MEID) and the 3GPP International Mobile station Equipment Identity (IMEI) are used to identify mobile equipment, they are separate identifiers and are not to be confused.
Internet implementations will not generally possess MEID identifiers. The identifiers generated by such implementations will typically be URNs within namespaces other than '3gpp2', and may, depending on context, even be non-URN URIs. Implementations are advised to be ready to process URIs other than '3gpp2' namespaced URNs, so as to aid in interoperability.

3.10. Resolution

No resolution is envisioned.

3.11. Documentation

Documentation can be found in the following specifications:

- A Uniform Resource Name Namespace for the Device Identity and the Mobile Equipment Identity (MEID)” [RFC XXXX].
- 3G Mobile Equipment Identifier [S.R0048-A].
- GHA (Global Hexadecimal Administrator) Assignment Guidelines and Procedures for Mobile Equipment Identifier (MEID) and Short Form Expanded UIM Identifier (SF_EUIMID) [SC.R4002-0].

3.12. Additional Information:

Because the syntax of a 3GPP2 Mobile Equipment Identity (MEID) differs from that of a 3GPP International Mobile station Equipment Identity (IMEI), reuse of the URN specified in RFC 7254 is not possible.

4. Specification

4.1. MEID Parameters

Any future change to the format of the ‘meid’ NSS requires the use of the procedure for URN NSS changes (currently through the publication of a future Informational RFCs approved by IETF consensus).

[draft-atarius-dispatch-meid-urn-as-instanceid] specifies how the MEID URN can be used as an instance ID as specified in [RFC5626]. Any change to the instance ID, will require an update to [draft-atarius-dispatch-meid-urn-as-instanceid]. An example of 3GPP2 MEID URN is:

urn:3gpp2:meid:A04B0D56-02A7E3
4.2. MEID Format

4.2.1. Overview

The MEID format is 15 hexadecimal digits encoded in 8 octets as defined in [S.R0048-A]. The first eight hexadecimal digits constitute the manufacturer code, the next six hexadecimal digits the serial number within the manufacturer code. The last hexadecimal digit is a check digit. For more details on the hexadecimal encoding c.f. 4.2.5.

4.2.2. Manufacturer Code

The manufacturer code is an 8 hexadecimal digit value. The manufacturer code identifies the mobile equipment manufacturer. The manufacturer code is chosen from a range of values allocated to the mobile equipment manufacturer in order to uniquely identify the mobile equipment.

4.2.3. Serial Number

The serial number is a 6 hexadecimal digit value. The serial number identifies equipment within the manufacturer code.

4.2.4. Check Digit

This is a single hexadecimal digit (bits 1-4 of octet 8) and is used as assurance of integrity in error-prone operations, e.g. when used with certain types of readers during inventory management operations. The check digit is not transmitted by the mobile equipment and are not used in the MEID URN.

4.2.5. Hexadecimal Encoding

The MEID format is 15 hexadecimal digits encoded in 8 octets as defined in [S.R0048-A]. The following figure is an abstract representation of a hexadecimal encoded MEID stored in memory (the actual storage format in memory is implementation specific). In this figure, the most significant digit of the Manufacturer Code is encoded in the bits 1-4 of octet 1. Bits 5-8 of octet 8 are zero-padded, since the bits 1-4 are only needed to encode the Check Digit. The most significant digit of the Serial Number is encoded in the bits 1-4 of octet 5. When MEID is included in a cellular signaling message, the Check Digit is omitted and the first 7 Octets in the following figure are only transmitted, [X.S0008-A].
5. IANA Considerations

In accordance with BCP 66 [RFC8141], IANA is asked to register the Formal URN namespace ‘3gpp2’ in the "Uniform Resource Name (URN) Namespaces" registry, using the registration template presented in Section 3 of this document.

6. Security and Privacy Considerations

An MEID is usually printed outside of the box, a mobile device ships in. The MEID may also be printed under the battery on a mobile device, however very few devices have removable batteries today. One can retrieve the MEID via either settings or by dialing *#06#. Anyone with brief physical access to the mobile device or its box can therefore easily obtain the MEID. Therefore MEIDs MUST NOT be used as security capabilities (identifiers whose mere possession grants access). Unfortunately there are currently examples of some applications which are using the MEID for authorization. Also some service providers’ customer service departments have been known to use knowledge of the MEID as "proof" that the caller is the legitimate owner of the mobile device. Both of these are inappropriate uses of the MEID.

Since the MEID is permanently assigned to the mobile equipment and is not modified when the ownership of the mobile equipment changes, (even upon a complete software reload of the mobile equipment), the MEID URN MUST NOT be used as a user identifier or user address by an application. Using the MEID to identify a user or as a user address could result in communications destined for a previous owner of a device being received by the new device owner or could allow the new device owner to access information or services owned by the previous device owner.

Additionally, since the MEID identifies the mobile equipment, it potentially could be used to identify and track users for the purposes of surveillance and call data mining if sent in the clear.
Since the MEID is personally identifiable information, uses of the MEID URN with IETF protocols require a specification and IETF expert review \[RFC5226\] in order to ensure that the privacy concerns are appropriately addressed. Protocols carrying the MEID URN SHOULD at a minimum use strongly hop-by-hop encrypted channels and that it is RECOMMENDED that end-to-end encryption is used.

7. Acknowledgements

This document draws heavily on the 3GPP2 work on Numbering, Addressing and Identification in \[S.R0048-A\] and also on the style and structure used in \[RFC7254\] and \[RFC4122\].

The author thanks for the detailed comments, provided by Ramachandran Subramanian, Alex Gogic, Randall Gellens, and Peter Saint-Andre.

8. References

8.1. Normative References


8.2. Informative References

[draft-atarius-dispatch-meid-urn-as-instanceid]

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