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A Uniform Resource Name Namespace for the Device Identity and the Mobile Equipment Identity (MEID)

draft-atarius-dispatch-meid-urn-13

Abstract

This document defines a Uniform Resource Name (URN) namespace for the Third Generation Partnership Project (3GPP2) and a Namespace Specific String (NSS) for the Mobile Equipment Identity (MEID). The structure of an MEID is 15 hexadecimal encoded 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. Document [RFC7254] defines a URN Namespace and an NSS for the IMEI. For cases where the mobile equipment uses decimal values (i.e., 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. Whilst this specification currently specifies only the MEID NSS under the '3gpp2' NID, additional NSS under the '3gpp2' NID may be specified in the future by the 3GPP2.

The hexadecimal 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.

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

Namespace ID: '3gpp2' requested

Registration Information:

Registration version number: 1

Registration date: 2017-10-01

Declared registrant of the namespace:

Registration organization:

Name: 3GPP2

Address:

John Derr, MEID Global Hexadecimal Administrator, JDerr@tiaonline.org
Gary Pellegrino, TIA TR-45 EUMAG Chair, gary@commflowresources.com
c/o Telecommunications Industry Association
1320 N. Courthouse Rd. Suite 200,
Arlington, Virginia 22201 USA

Declaration of syntactic structure:

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 *( ";" future-param )
future-specifier     = pp2-defined-nonempty   ;3GPP2 defined
future-param         = par-name [ EQUAL par-value ]
par-name             = pp2-defined-nonempty
par-value            = pp2-defined-nonempty
EQUAL                = "="
pp2-defined-nonempty = 1*pp2-urn-char
pp2-urn-char         = ALPHA / DIGIT / "-" / "." / "_" / "%" / ":"
ALPHA                = %x41-5A / %x61-7A; A-Z / a-z
DIGIT                = %x30-39; 0-9
```

An NSS for the MEID is defined under the '3gpp2' NID.

An MEID is an identifier under the '3gpp2' NID that uniquely identifies mobile equipment used in 3GPP2 defined networks.

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"
```

<future-pp2-specifier> and <pp2-defined-nonempty> can comprise any ASCII characters compliant with URN syntax in [RFC5234].

The 3GPP2 will take responsibility for the '3gpp2' namespace, including the 'meid' NSS.

Relevant ancillary documentation:

See 3G Mobile Equipment Identifier [S.R0048-A] and GHA (Global Hexadecimal Administrator) Assignment Guidelines and Procedures for Mobile Equipment Identifier (MEID) and Short Form Expanded UIM Identifier (SF_EUIMID) [SC.R4002-0].

Identifier uniqueness considerations:

Identifiers in the '3gpp2' NID are defined and assigned by the 3GPP2 or an agency appointed by 3GPP2 after ensuring that the URNs to be assigned are unique. Uniqueness is achieved by checking against the IANA registry of previously assigned names.

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.

Identifier persistence considerations:

The 3GPP2 is committed to maintaining uniqueness and persistence of all resources identified by assigned URNs.

As the NID sought is '3gpp2', and 3GPP2 is the long standing acronym for the standards organization which includes the mobile phone operators, the URN should also persist indefinitely (at least as long as there is a need for its use). The assignment process guarantees that names are not reassigned. The binding between the name and its resource is permanent.

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.

Process of identifier assignment:

The 3GPP2 or its approved agency will manage the <NSS> (including '3gpp2') and <future-pp2-specifier> identifier resources to maintain

uniqueness. The process for MEID assignment is documented in [SC.R4002-0].

Process for identifier resolution:

Since the '3gpp2' NSS is not currently globally resolvable, this is not applicable.

Rules for Lexical Equivalence:

Two 3GPP2 MEID URNs are equivalent if they have the same 'meidval' and the same parameter values in the same sequential order. All of these comparisons are to be case-insensitive.

Any identifier in '3gpp2' NSS can be compared using the normal mechanisms for percent-encoded UTF-8 strings (see [RFC3629]).

Conformance with URN Syntax:

The string representation of the '3gpp2' NID and of the MEID NSS is fully compatible with the URN syntax (see [RFC8141]).

Validation Mechanism:

The MEID can be validated using the mechanism defined in [S.R0048-A].

Scope:

3GPP2 URN is global in scope.

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. 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.

4.2.2. Serial Number

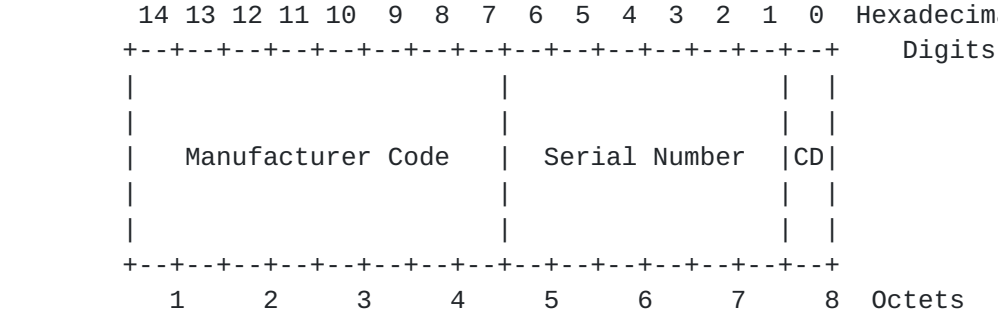
The serial number is a 6 hexadecimal digit value. The serial number identifies equipment within the manufacturer code.

4.2.3. 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.

4.2.4. 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.S0008-0].



5. Community considerations

3GPP2 defined mobile equipment will interoperate with Internet devices for a variety of voice and data communication services. To do this, they need to make use of Internet protocols that will operate end to end between mobile equipments in 3GPP2 networks and devices in the general Internet. Some of these protocols require the use of URNs as identifiers. Within the 3GPP2 networks, mobile equipments are identified by their MEID. Internet users will need to be able to receive and include the 3GPP2 URN in various Internet protocol elements to facilitate communication between pure Internet-based devices and 3GPP2 mobile equipments. Thus the existence and syntax of these namespaces needs to be available to the general Internet community and the namespace needs to be reserved with IANA in order to guarantee uniqueness and prevent potential namespace conflicts both within the Internet and within 3GPP2 networks. Conversely, 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.

6. Namespace considerations

A URN was considered the most appropriate URI to represent the MEID as this identifier may be used and transported similarly to the Universally Unique Identifier (UUID) which is defined as a URN in [RFC4122]. Since specifications for protocols that are used to transport device identifiers often require the device identifier to be globally unique and in the URN format, it is necessary that the URN formats are defined to represent the MEID.

7. 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.

8. 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 provider's 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.

9. 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, and Randall Gellens.

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10.2. Informative References

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