SenML Base Name Prefix Indication
draft-keranen-core-senml-base-prefix-00

Abstract

   The Sensor Measurement Lists (SenML) media type uses globally unique
   names to facilitate information exchange across systems. This
   requirement often leads to long names and hence large amount of data
   to be transmitted with each SenML Pack. This document defines an
   efficient mechanism to indicate a globally unique prefix for names.

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   provisions of BCP 78 and BCP 79.

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1. Introduction

   The Sensor Measurement Lists (SenML) media type [RFC8428] indicates
   sources of information with globally unique names. A SenML Pack can
   indicate "base names" ("bn" field) that are prefixed to all names
   ("n" fields) in the SenML Records where the "bn" appears and all
   subsequent records until a new base name is indicated. Example of a
   SenML Pack with two sources of measurement data that share a base
   name is shown in Figure 1.

```
   [
     {"bn":"2001:db8:1234:5678::1/",
      "n":"temperature", "u":"Cel", "v":25.2},
     {"n":"humidity", "u":"%RH", "v":30}
   ]
```

        Figure 1: SenML Pack with two sources of measurements

   The base name construct enables indicating the globally unique part
   of the name only once for a set of Records. However, the globally
   unique part still needs to be indicated in each Pack. Since base
   name is often relatively long, in some scenarios it would be useful
   to be able to further compress or omit this information.

   Since the sender and receiver of a SenML Pack often share context
   information beyond what is in the SenML Pack, e.g., request URI when
   a RESTful protocol is used, sender IP address, or security
   association information. This information can be used to assist
   constructing the globally unique part of a name. However, the sender
   of the Pack needs to be able to indicate unambiguously what

information is used and how the name is generated from that
information.

This document registers a new SenML field to indicate what
information outside of the SenML Pack should be used as a prefix to
the base name(s). Also rules for consistently creating SenML names
from this information is specified for each information source.

Since SenML has only a small set of characters that are allowed in
names (see Section 4.5.1 in [RFC8428]) replacing rules for characters
outside of this set (e.g., brackets and semicolons) are also defined.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
"OPTIONAL" in this document are to be interpreted as described in
BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all
capitals, as shown here.

Readers should also be familiar with the terms and concepts discussed
in [RFC8428].

3. Indicating base name prefix

SenML field "bpi" contains an integer value that indicates what
information should be used by the receiver to construct a prefix to
the base names. This document defines following modes:

1: IPv4 or IPv6 address of the sender

2: IPv4 or IPv6 address and port of the sender

3: Base URI of the request URI

5: Fingerprint of the public key of the sender

6: TLS PSK Identity

10: CoRE Resource Directory endpoint ID

The following sub-sections define rules for generating SenML basename
prefix for each mode. Some rules require replacing characters from
the input identifiers with characters that are safe for SenML names.
Applying these rules may result in multiple different input
identifiers being mapped to the same output identifer. The sender of
the SenML Pack MUST ensure that such mapping does not result in
conflicting names from that sender.

3.1. IP address

The SenML Pack sender IP address can be used without (mode 1) or with (mode 2) port number to generate the base name prefix.

For IPv6 addresses the format defined in [RFC5952] without brackets ("[" and "]") MUST be used.

Example: "2001:db8::1"

For IPv6 address and port underscore ("_") for port separator MUST be used.

Example: "2001:db8::1_5683"

For IPv4 addresses the "dot decimal" notation MUST be used.

Example: "192.0.2.1"

For IPv4 addresses colon (":") MUST be used for port separator.

Example: "192.0.2.1:5684"

3.2. Request Base URI

When a RESTful protocol (e.g., CoAP [RFC7252] or HTTP [RFC7230]) is used to request a SenML Pack, the base of the target request URI can be used as the base name prefix. If IP address is used in the authority part of the URI, rules in Section 3.1 MUST be followed for it.

Characters in the URI that are not in the character set allowed for SenML names MUST be replaced with the underscore ("_") character.

Example: "coap://example.com/room1/"

3.3. Public key fingerprint

When X.509 certificate or raw public key is used to setup the security association (e.g., a TLS connection) to retrieve a SenML Pack, a fingerprint of the public key of the sender of the SenML Pack can be used as the base name prefix. For a public key fingerprint the "URL Segment Format" of [RFC6920] with ";" characters replaced with "_" MUST be used.

Example: "sha-256_UyaQV-Ev4rdLoHyJJWCi11OHfrYv9E1aGQAlMO2X_-Q"

3.4. TLS PSK Identity

   When a pre-shared key (PSK) ciphersuites (e.g., [RFC4279])) are used
   to establish a TLS connection, the PSK identity can be used as the
   base name prefix. In this mode the PSK identity from the TLS
   handshake with characters not allowed for SenML names replaced with
   "_" MUST be used.

   Example: "foo.example.com"

3.5. CoRE Resource Directory endpoint ID

   When the sender has registered with the receiving system using the
   CoRE Resource Directory [I-D.ietf-core-resource-directory] interface,
   and has defined an "endpoint name" during the registration, the
   endpoint name can be used as the base name prefix. Characters not
   allowed for SenML names MUST be replaced with "_".

   Example: "urn:dev:ow:10e2073a01080063"

4. IANA Considerations

   IANA is requested to assign a new label in the "SenML Labels"
   subregistry of the SenML registry [IANA.senml] (as defined in
   [RFC8428]) for the "Base Name Prefix Indicator" as follows:

   +-----------------------+-------+----------+---------+--------------+
   | Name | Label | JSON | XML | Reference |
   | | | Type | Type | |
   +-----------------------+-------+----------+---------+--------------+
   | Base Name Prefix | bpi | Number | int | this |
   | Indicator | | | | document |
   +-----------------------+-------+----------+---------+--------------+

   IANA is requested to create a new "SenML Base Name Prefix Indicator
   modes" subregistry to the SenML registry. Initial contents of the
   subregistry is shown below:

```
            +-------------------+-------+---------------+
            | Name              | Value | Reference     |
            +-------------------+-------+---------------+
            | IP address        | 1     | this document |
            |                   |       |               |
            | IP address & port | 2     | this document |
            |                   |       |               |
            | Base URI          | 3     | this document |
            |                   |       |               |
            | Public key        | 5     | this document |
            |                   |       |               |
            | TLS PSK ID        | 6     | this document |
            |                   |       |               |
            | CoRE RD endpoint  | 10    | this document |
            +-------------------+-------+---------------+
```

Acknowledgements

   TBD

6. References

6.1. Normative References

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