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SenML Base Name Prefix Indication  
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## 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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[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 identifier. 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-Ev4rdLoHyJJWCi110HfrYv9E1aGQAlM02X\_-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 Type	XML Type	Reference
Base Name Prefix Indicator	bpi	Number	int	this 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

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