Live E! Sensor Data Upload I/F Specification

--- DataUpload200703 ---

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1. Abstract

This specification defines an interface(I/F) for uploading sensor readings toward Live E! data platform. Live E! service has (1)profile registration I/F, (2)data upload I/F and (3) data retrieval I/F (Figure 1). This document describes only (2) data upload I/F.

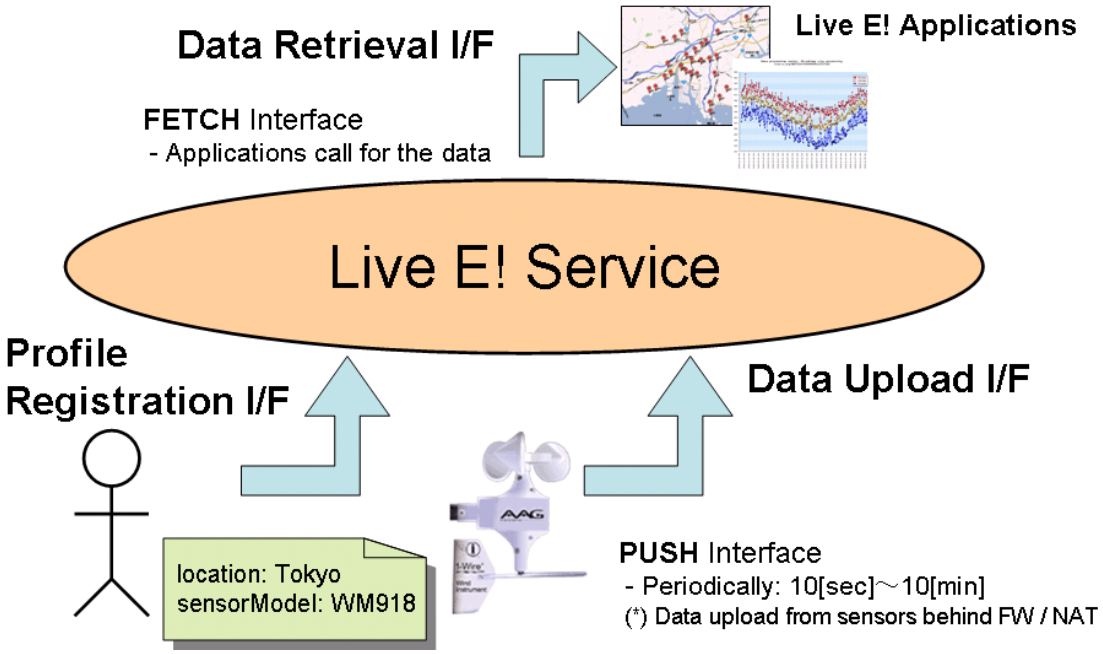

Fig. 1: Live E! Service Overview

Live E! service is implemented by a collection of servers, which are networked among them in overlay networking manner. These three types of I/Fs are attached to every server node, via which sensors and users upload/download sensor readings.

2. Data Upload I/F

Data Upload I/F is deployed as an SOAP/XML Web service. We define the name of service and methods as follows.

<<Service Name>>

DataUpload200703

<<Methods>>

String uploadElement(String data); // upload by element sensor unit
String uploadCombined(String data); // upload by combined sensor unit
String uploadCollection(String data); // upload by a collection of combined sensor units

How to call the service: (an example in perl script)

```
#!/usr/bin/perl
use strict;
use warnings;
use SOAP::Lite;

# formatting of uploading sensor data
$data = .... ;

# data transmission
my $server = SOAP::Lite -> service('http://live-e2.hongo.wide.ad.jp/axis/services/DataUpload200703?wsdl');
my $res = $server-> uploadCombined($data);

# Response checking with error management
....
```

2.1. String uploadElement(String data);

Upload data by element sensor unit. Collection of data in the element sensor can be also uploaded with Timestamp information. The password should be encoded by BASE64, and it should be set by authorization attribute in sensor XML tag.

The format of **data** (uploadElement)

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensor id="SENSOR_ELEMENT_ID" authorization="BASE64_ENCODED_PASSWD" xmlns="
http://live-e.org/DataType/2007/03/">
  <VALUE_TAG time="W3CTIMESTAMP" [(VALUE_ATTR)*]> VALUE </VALUE_TAG>
  ... Repeat of <VALUE_TAG ... > VALUE </VALUE_TAG>...
</sensor>
```

The semantics of the data field

Data Field	Semantics
SENSOR_ELEMENT_ID	Identifier (ID) of the element sensor
BASE64_ENCODED_PASSWD	Access password for the ID. It should be encoded by base64.
VALUE_TAG	VALUE_TAG={value|sVAlue} value – VALUE is numeric type. sValue – VALUE is character string type.
W3CTIMESTAMP	The time that the VALUE was observed in W3C Timestamp format. E.g., 2007-06-27T00:00:00.0000000+09:00
VALUE_ATTR	An attribute, a "name=value" pair, which schema is defined by profile schema. E.g., (1) The location of the value observed: latitude="35.314" longitude="135.231" E.g., (2) The status of the value observed: error="overflow"
VALUE	The value that the sensor observed.

An example 1: A numeric data upload

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensor      id="live-e.naist.jp/WM918/Temperature"   authorization="MDAwMDAwMDA="
xmlns="http://live-e.org/DataType/2007/03/" >
  <value time="2007-06-27T00:00:00.0000000+09:00">25.6</value>
</sensor>
```

An example 2: Uploading character strings

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensor      id="live-e.naist.jp/WM918/Temperature"   authorization="MDAwMDAwMDA="
xmlns="http://live-e.org/DataType/2007/03/" >
  <sValue time="2007-06-27T00:00:00.0000000+09:00">Hot</sValue>
  <sValue time="2007-06-27T00:10:00.0000000+09:00">Cool</sValue>
</sensor>
```

An example 3: Uploading the error attribute

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensor        id="live-e.naist.jp/WM918/Temperature"    authorization="MDAwMDAwMDA="
xmlns="http://live-e.org/DataType/2007/03/" >
  <value time="2007-06-27T00:00:00.0000000+09:00" error="overflow">40.0</value>
  <value time="2007-06-27T00:10:00.0000000+09:00" >39.9</value>
</sensor>
```

<<Return Value>>

uploadElement returns the following values.

If succeeded,

```
<true />
```

If any error has occurred,

```
<error type="ERROR_TYPE" xmlns="http:// live-e.org/Error/2007/03/"> ERROR_MESSAGE</error>
```

ERROR_TYPE is one of the following values.

- authentication:　Authentication error
- outOfMaxSize:　Too much value counts (= exceeded maxValueCollectionCount)
- internal:　Unknown error

No data should be saved into the database if any error has occurred.

2.2. String uploadCombined(String data);

Upload data by combined sensor unit. Collection of data in the element sensor can be also uploaded with Timestamp information. The password should be encoded by BASE64, and it should be set by authorization attribute in sensorGroup XML tag.

The format of **data** (uploadCombined)

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensorGroup class="combined" id=" SENSOR_COMBINED_ID" authorization ="
BASE64_ENCODED_PASSWD" xmlns="http://live-e.org/DataType/2007/03/">
  <sensor id="SENSOR_ELEMENT_ID">
    <VALUE_TAG time="W3CTIMESTAMP" [(VALUE_ATTR)*]> VALUE </VALUE_TAG>
      ... Repeat of <VALUE_TAG ... > VALUE </VALUE_TAG> ...
  </sensor>
  ... Repeat of <sensor> </sensor> ...
</sensorGroup>
```

The semantics of the data field

Data Field	Semantics
SENSOR_COMBINED_ID	Identifier (ID) of the combined sensor
SENSOR_ELEMENT_ID	Identifier (ID) of the element sensor
BASE64_ENCODED_PASSWD	Access password for the ID. It should be encoded by base64.
VALUE_TAG	VALUE_TAG={value|sValue} value – VALUE is numeric type. sValue – VALUE is character string type.
W3CTIMESTAMP	The time that the VALUE was observed in W3C Timestamp format. E.g., 2007-06-27T00:00:00.0000000+09:00
VALUE_ATTR	An attribute, a "name=value" pair, which schema is defined by profile schema. E.g., (1) The location of the value observed: latitude="35.314" longitude="135.231" E.g., (2) The status of the value observed: error="overflow"
VALUE	The value that the sensor observed.

<<Return Value>>

uploadCombined returns the following values.

If succeeded,

```
<true />
```

If any error has occurred,

```
<error type="ERROR_TYPE" xmlns="http:// live-e.org/Error/2007/03/"> ERROR_MESSAGE</error>
```

ERROR_TYPE is one of the following values.

- authentication: Authentication error
- outOfMaxSize: Too much value counts (= exceeded maxValueCollectionCount)
- internal: Unknown error

No data should be saved into the database if any error has occurred.

2.3. String uploadCollection(String data);

Upload data by a collection of combined sensor units. The password should be encoded by BASE64, and it should be set by authorization attribute in the field of "<sensorGroup class="combined" ".

The format of **data** (uploadCollection)

```
<?xml version="1.0" encoding="UTF-8" ?>
<sensorGroup class="collection" xmlns="http://live-e.org/DataType/2007/03/">
  <sensorGroup class="combined" id="SENSOR_COMBINED_ID" authorization ="
BASE64_ENCODED_PASSWD">
    <sensor id="SENSOR_ELEMENT_ID">
      <VALUE_TAG time="W3CTIMESTAMP" [(VALUE_ATTR)*]> VALUE </VALUE_TAG>
      ... Repeat of <VALUE_TAG ... > VALUE </VALUE_TAG> ...
    </sensor>
    ... Repeat of <sensor> </sensor> ...
  </sensorGroup>
  ... Repeat of <sensorGroup class="combined"></sensorGroup> ...
</sensorGroup>
```

The semantics of the data field

Data Field	Semantics
SENSOR_COMBINED_ID	Identifier (ID) of the combined sensor
SENSOR_ELEMENT_ID	Identifier (ID) of the element sensor
BASE64_ENCODED_PASSWD	Access password for the ID. It should be encoded by base64.
VALUE_TAG	VALUE_TAG={value|sVAlue} value – VALUE is numeric type. sValue – VALUE is character string type.
W3CTIMESTAMP	The time that the VALUE was observed in W3C Timestamp format. E.g., 2007-06-27T00:00:00.0000000+09:00
VALUE_ATTR	An attribute, a "name=value" pair, which schema is defined by profile schema. E.g., (1) The location of the value observed: latitude="35.314" longitude="135.231"

	E.g., (2) The status of the value observed: error="overflow"
VALUE	The value that the sensor observed.

<<Return Value>>

uploadCollection returns the following values.

If succeeded,

```
<true />
```

If any error has occurred,

```
<error type="ERROR_TYPE" xmlns="http:// live-e.org/Error/2007/03/"> ERROR_MESSAGE</error>
```

ERROR_TYPE is one of the following values.

- authentication: Authentication error
- outOfMaxSize: Too much value counts (= exceeded maxValueCollectionCount) or too much sensor collections (= exceededmaxSensorCollection)
- internal: Unknown error

No data should be saved into the database if any error has occurred.