Live E! Data Retrieval I/F Specification

--- DataProvider200901 ---

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1. Abstract

This specification defines an interface(I/F) for managing sensor profiles in 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 (1) profile registration I/F.

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.

*Note) This specification describes DataProvider200901. The currently operated services (i.e., DataProvider200703 and GlobalDataProvider200703) should be revised, and in the future, it might to be closed. To use those obsolete services, please see the Live E! operation manual: http://live-e.hongo.wide.ad.jp/dist/
2. Data Retrieval I/F

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

<< Service Name >>
DataProvider200901

<<Methods>>
String isCombined(String id);
String getData(String id);
String getProfile(String id);
String getArchiveData(String id, String start, String end);
String getArchiveProfile(String id, String start, String end);

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

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

# Setting of id
$id = ..... ;

# remote procedure call
my $res = $server->getData($id);

# Parse the response XML
...
```
2.1. **String isCombined(String id);**

isCombined returns the entity type of the id.

<<Return Value>>

If the id is bound to a combined sensor: <true />
If the id is bound to a element sensor: <false />

If any error has occurred,

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

ERROR_TYPE is one of the following values.

- **sensorNotFound:** No sensors bound to the id were found.
- **internal:** Unknown Error
2.2. **String getData(String id):**

ggetData returns the latest data bound to the id. The id can be bound to combined sensor or element sensor.

**<<Return Value>>**

ggetData returns the following values:

1. If the id is bound to a combined sensor

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

2. If the id is bound to an element sensor

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

The semantics of the data field

<table>
<thead>
<tr>
<th>Data Field</th>
<th>Semantics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENSOR_COMBINED_ID</td>
<td>Identifier (ID) of the combined sensor</td>
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<tr>
<td>SENSOR_ELEMENT_ID</td>
<td>Identifier (ID) of the element sensor</td>
</tr>
<tr>
<td>COMBINED_ATTR</td>
<td>An attribute, a &quot;name=value&quot; pair, which schema is defined by profile schema for combined sensors. E.g., (1) The location of the value observed: latitude=&quot;35.314&quot; longitude=&quot;135.231&quot; E.g., (2) The status of the value observed: error=&quot;overflow&quot;</td>
</tr>
<tr>
<td>ELEMENT_ATTR</td>
<td>An attribute, a &quot;name=value&quot; pair, which</td>
</tr>
</tbody>
</table>
schema is defined by profile schema for element sensors.
E.g., (1) The type of the element sensor, sensorType="Temperature"
E.g., (2) The available observation range, valueMax="40.0" valueMin="-10.0"
E.g., (3) The measurement type measurementType="Celsius"

| VALUE_TAG          | VALUE_TAG={value | sValue} |
|--------------------|----------------------------|
| value              | VALUE is numeric type.     |
| sValue             | VALUE is character string type. |

<table>
<thead>
<tr>
<th>W3CTIMESTAMP</th>
<th>The time that the VALUE was observed in W3C Timestamp format.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.g., 2007-06-27T00:00:00.0000000+09:00</td>
<td></td>
</tr>
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<table>
<thead>
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<th>VALUE</th>
<th>The value that the sensor observed.</th>
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If any error has occurred,

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

ERROR_TYPE is one of the following values.

- sensorNotFound: No sensors bound to the id were found.
- internal: Unknown Error
2.3. String getProfile(String id);

getProfile returns the profile of the sensor id. The id can be bound to combined sensor or element sensor.

<<Return Value>>

getProfile returns the following values.

1. If the id is bound to a combined sensor

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<sensorGroup class="combined" id="SENSOR_COMBINED_ID" [COMBINED_ATTR]*]
xmllns="http://live-e.org/DataType/2007/03/"
  <sensor id="SENSOR_ELEMENT_ID" [ELEMENT_ATTR]*
  ...
</sensorGroup>
```

2. If the id is bound to an element sensor

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<sensor id="SENSOR_ELEMENT_ID" [ELEMENT_ATTR]*
xmllns="http://live-e.org/DataType/2007/03/"
```

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<td>Identifier (ID) of the element sensor</td>
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</tbody>
</table>
| COMBINED_ATTR          | An attribute, a "name=value" pair, which schema is defined by profile schema for combined sensors. 
                        | 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" 
| ELEMENT_ATTR           | An attribute, a "name=value" pair, which schema is defined by profile schema for element sensors. 
                        | E.g., (1) The type of the element sensor, 
                        | sensorType="Temperature" |

... Repeat of `<sensor />` ...
E.g., (2) The available observation range, valueMax="40.0" valueMin="-10.0"
E.g., (3) The measurement type measurementType="Celsius"

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.

- sensorNotFound: No sensors bound to the id were found.
- internal: Unknown Error
2.4. String getArchiveData(String id, String aggPeriodType, String start, String end);

getArchiveData returns the archived data of the sensor id from time=[start, end]. Depending on the parameter of aggPeriodType, it returns raw data, hourly aggregated data and so on. The id can be bound to a combined sensor or an element sensor.

<<Parameters>>

- id: an identifier bound to either a combined sensor or an element sensor.
- aggPeriodType: aggregation time unit
  - "aggPeriodNone": raw data
  - "aggPeriodHourly": hourly aggregated data
  - "aggPeriodDaily": daily aggregated data
  - "aggPeriodMonthly": monthly aggregated data
- start: the start time of the target time span in W3CTimestamp Format
- end: the end time of the target time span in W3CTimestamp Format

<<Return Value>>

getArchiveData returns the following values.

1. If the id is bound to a combined sensor and aggPeriodType="aggPeriodNone"

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

2. If the id is bound to an element sensor and aggPeriodType="aggPeriodNone"

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

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

ERROR_TYPE is one of the following values.

- **out ofMaxValueSize**: The number of target values exceeded the system limit.
- **sensorNotFound**: No sensors bound to the id were found.
- **internal**: Unknown Error
2.5. String getArchiveProfile (String id, String start, String end):

getArchiveProfile returns the archived history of the profile for the sensor id from
time=[start, end]. The id can be bound to a combined sensor or an element sensor.

<<Parameters>>
id: An identifier bound to either a combined sensor or an element sensor.
start: the start time of the target time span in W3CTimestamp Format
end: the end time of the target time span in W3CTimestamp Format

<<Return Value>>

getArchiveProfile returns the following values.

1. If the id is bound to a combined sensor,

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<sensorGroup class="collection" xmlns="http://live-e.org/DataType/2007/03/" >
  <sensorGroup class="combined" 
    created="2007-07-25T00:52:55.00000000+09:00"
    expired="2007-07-25T06:09:59.00000000+09:00"
    id="SENSOR_COMBINED_ID" [(COMBINED_ATTR)*] >
    <sensor created="2007-07-25T00:52:55.00000000+09:00"
      expired="2007-07-25T06:09:59.00000000+09:00"
      id="SENSOR_ELEMENT_ID" [(ELEMENT_ATTR)*]/>
    ... Repeat of <sensor /> ...
  </sensorGroup>
  ... Repeat of <sensorGroup class="combined"> </sensorGroup> ...
</sensorGroup>
```

2. If the id is bound to a element sensor,

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<sensorGroup class="collection" xmlns="http://live-e.org/DataType/2007/03/" >
  <sensor created="2007-07-25T00:52:55.00000000+09:00"
    expired="2007-07-25T06:09:59.00000000+09:00"
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