



## D5.1 - Integrated Emergency Profiles

<i>Due Date:</i>	November 30, 2016
<i>Actual Submission Date:</i>	
<i>Lead Beneficiary in charge of the Deliverable:</i>	SRDC
<i>Revision:</i>	V0.12
<i>Grant Agreement:</i>	607729
<i>Project Acronym:</i>	C2-SENSE
<i>Project Title:</i>	Interoperability Profiles for Command/Control Systems and Sensor Systems in Emergency Management
<i>Funding Scheme:</i>	SEC-2013.5.3-1
<i>Project Start Date:</i>	April 01, 2014
<i>Duration:</i>	42 months

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

### *Disclaimer*

The text, figures and tables in this report can be reused under a provision of the Creative Commons Attribution 4.0 International License. Logos and other trademarks are not covered by this license.

The content of the publication herein is the sole responsibility of the publishers and it does not necessarily represent the views expressed by the European Commission or its services.

While the information contained in the documents is believed to be accurate, the authors(s) or any other participant in the C2-SENSE consortium make no warranty of any kind with regard to this material including, but not limited to the implied warranties of merchantability and fitness for a particular purpose.

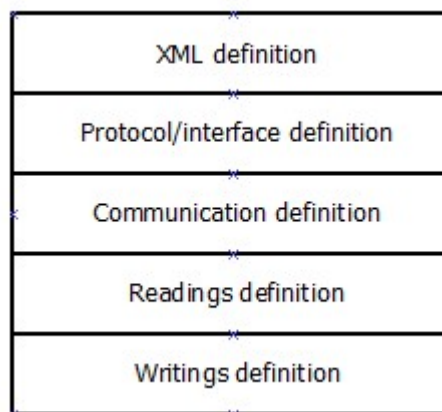
Neither the C2-SENSE Consortium nor any of its members, their officers, employees or agents shall be responsible or liable in negligence or otherwise howsoever in respect of any inaccuracy or omission herein.

Without derogating from the generality of the foregoing neither the C2-SENSE Consortium nor any of its members, their officers, employees or agents shall be liable for any direct or indirect or consequential loss or damage caused by or arising from any information advice or inaccuracy or omission herein.

# 1 PHYSICAL INTEROPERABILITY PROFILES

Physical Interoperability Profiles are the main part of Physical Interoperability Layer. They contain data and information about physical connection with the communication medium and specify the data acquisition procedure. Physical Interoperability Profiles match the interoperability definition and can successfully be used in Physical Interoperability Layer, as they allow connection of a large variety of devices with specified interface and protocol to systems such as C2-SENSE Framework.

Physical Interoperability Profiles are based on the XML data format. Its structure is universal for all the profiles and is represented in Figure 1. In this structure, all important components regarding physical communication with the device are included.



*Figure 1 Universal structure of physical profile*

Universal structure of physical profile includes all important information about device and data to be collected from the communication medium. Profile is strictly adapted to the physical interface and protocol. Information included in proper field (for example communication specification) are unlimited, so basically every detail of configuration can be specified in the profile.

Protocol/interface definition is required for recognizing the selected communication type and create new adapter in accordance to that choice. Communication definition contains all the important parameters, which should be included during interface and protocol configuration. Having these two definitions specified, it is possible to establish the connection between system and considered communication medium. Readings definition of data acquisition specifies details about data to read, e.g. variable type, number of bits to read or if it is signed or not, while writings definition provides specifications of values to be written in the communication device.

Physical Interoperability Profiles are not integrated with any other layer, because they are considered as hardware profiles and it makes more sense to treat them separately than Technical Interoperability Profiles and focus on seamless interfacing of physical devices with C2-SENSE components through these profiles.

Physical Interoperability Profiles include information about the interface and protocol necessary to link communication medium with IP based Gateway, which is equal with linking the communication medium with C2-SENSE. IP based Gateway includes set of libraries responsible for protocols and interfaces support. To sum up, this definition signalizes which library should be used during adapter creation process. However, every device has its own communication parameters (for example baud rate or parity in case of RS interfaces).

In C2-SENSE, 3 Physical Interoperability Profiles have been developed and tested:

1. GPRS modem, connected to the PC with RS232 interface and MODBUS RTU protocol
2. Device for electrical parameters measurement
3. 866MHz or 433 MHz Radio Transceivers

In these above described cases, three adapters are created automatically and they are in charge of following readings:

- Adapter 1 (GPRS) – two temperature measurements, two relative humidity measurements, two rainfall measurements.
- Adapter 2 (Power meter) – Network voltage, network frequency, THD (Total Harmonic Distortion).
- Adapter 3 (Radio) – three temperature measurements, three relative humidity measurements.

## 2 PROFILE FOR ELECTRICAL PARAMETERS MEASUREMENT DEVICE

The device is LUMEL ND 10 power network meter. It is responsible for monitoring power network parameters, to which IP Gateway is connected (in order to foresight possible network breakdowns).

```
<?xml version="1.0"?>
<Device id="2">
  <Description>
    Device for electrical parameters measurement
  </Description>
  <Communication_spec type="RS/MODBUS">
    <serial_port>/dev/ttyUSB0</serial_port>
    <baud_rate>19200</baud_rate>
    <byte_size>8</byte_size>
    <parity>NONE</parity>
    <stopbits>2</stopbits>
    <timeout>0.7</timeout>
    <instr_address>2</instr_address>
    <mode>rtu</mode>
  </Communication_spec>
  <Readings>
    <!-->Random value from second device</!-->
    <Reading id="1">
      <!-->READ SPECIFICATION</!-->
      <var_type>float</var_type>
      <bits>32</bits>
      <signed>True</signed>
      <read_type>3</read_type>
      <register_address>7028</register_address>
      <num_of_dec_reg>2</num_of_dec_reg>
      <!--> WORKFLOW SPECIFICATION </!-->
      <period>10</period>
      <mute>False</mute>
      <!--> DESCRIPTION SPECIFICATION </!-->
      <sensor_name>IPGW Voltage</sensor_name>
```

```

        <phen_name>Voltage</phen_name>
        <description_phen>Voltage no. 1</description_phen>
        <unit>V</unit>
        <geo_location>[52.147,20.967]</geo_location>
    </Reading>
<Reading id="2">
    <!-->READ SPECIFICATION</!-->
    <var_type>float</var_type>
    <bits>32</bits>
    <signed>True</signed>
    <read_type>3</read_type>
    <register_address>7056</register_address>
    <num_of_dec_reg>2</num_of_dec_reg>
    <!--> WORKFLOW SPECIFICATION </!-->
    <period>10</period>
    <mute>False</mute>
    <!--> DESCRIPTION SPECIFICATION </!-->
    <sensor_name>IPGW Frequency</sensor_name>
    <phen_name>Frequency</phen_name>
    <description_phen>Frequency no. 1</description_phen>
    <unit>Hz</unit>
    <geo_location>[52.147,20.967]</geo_location>
</Reading>
<Reading id="3">
    <!-->READ SPECIFICATION</!-->
    <var_type>float</var_type>
    <bits>32</bits>
    <signed>True</signed>
    <read_type>3</read_type>
    <register_address>7072</register_address>
    <num_of_dec_reg>2</num_of_dec_reg>
    <!--> WORKFLOW SPECIFICATION </!-->
    <period>10</period>
    <mute>False</mute>
    <!--> DESCRIPTION SPECIFICATION </!-->
    <sensor_name>IPGW THD</sensor_name>
    <phen_name>THD</phen_name>
    <description_phen>THD no. 1</description_phen>
    <unit>%</unit>
    <geo_location>[52.147,20.967]</geo_location>
</Reading>
</Readings>
<Writings>
    <Writing id="1">
        <var_type>int</var_type>
        <bits>16</bits>
        <signed>True</signed>
        <value>1</value>
        <write_type>4</write_type>
        <register_address>6</register_address>
        <num_of_dec_reg>0</num_of_dec_reg>
    </Writing>
</Writings>
</Device>

```