2013

2 Save Energy Limited

[NETWORK OWL MULTICAST PROTOCOL]

Description of the XML data packets sent by the Network OWL via multicast UDP, multicast settings and links to example source code. For use with Network OWL firmware v2.0

CONTENTS

CHANGE HISTORY

Date	Author	Description
25/01/2013	BW	Initial draft containing example packets
12/11/2013	BW	Updated for NOWL v2.4 – New Heating format and hot water/relay packets

INTRODUCTION

MULTICAST CONFIGURATION

SETTINGS

The Network OWL sends UDP packets to the following multicast group:

Address: 224.192.32.19
Port: 22600

There are a number of multicast examples available on the internet, some listed below. The values above can be used with these examples to get you started receiving multicast data from the Network OWL.

Java
http://lycog.com/programming/multicast-programming-java/

C/C++
http://ntrg.cs.tcd.ie/undergrad/4ba2/multicast/antony/example.html

MULTICAST PACKETS

ELECTRICITY DATA PACKET

EXAMPLE PACKET

```
<electricity id='443719999999'>
  <signal rssi='-71' lqi='127'/>
  <battery level='100%'/>
  <chan id='0'><curr units='w'>483.00</curr><day units='wh'>10244.99</day></chan>
  <chan id='1'><curr units='w'>0.00</curr><day units='wh'>0.00</day></chan>
```

```
    <chan id='2'><curr units='w'>0.00</curr><day units='wh'>0.00</day></chan>
</electricity>
```

PARAMETERS

The <chan> tags contain data for the current reading (<curr>) and the daily total (<day>) for each of the channels/phases on the electricity transmitter. If the transmitter only has 1 channel, the last 2 channels will always contain 0 values.

Tag	Attribute	Description
Electricity	Id	The MAC Address of the Network OWL
Signal	rssi	Receive signal strength (dBm)
Signal	lqi	Link quality (closer to 0 the better)
Battery	level	Percentage of battery remaining
Chan	id	Transmitter channel number
Curr/Day	units	Units for the value in the xml tag. wh = Watt Hours, divide by 1000 to get kWh w = watts

SOLAR DATA PACKET

EXAMPLE PACKET

```
<solar id='00A0C914C851'>
    <current><generating units='w'>0.00</generating><exporting units='w'>0.00</exporting></current>
    <day><generated units='wh'>0.00</generated><exported units='wh'>0.00</exported></day>
</solar>
```

PARAMETERS

The main <solar> tag contains sections for the current solar readings (<current>) and the totals for the day (<day>). Both sections have <generated> and <exported> tags that contain the values for power generated by the PV system and power exported to the electricity grid.

Tag	Attribute	Description
Solar	Id	The MAC Address of the Network OWL
Curr/Day	units	Units for the value in the xml tag. wh = Watt Hours, divide by 1000 to get kWh w = watts

WEATHER DATA PACKET

EXAMPLE PACKET

```
<weather id='00A0C914C851' code='263'>
   <temperature>19.00</temperature>
   <text>Patchy light drizzle</text>
</weather>
```

PARAMETERS

The <weather> tag contains temperature and text subsections. The <temperature> is the current outside temperature for the postcode assigned to the Network OWL. The text is a textural description of the weather at that postcode.

Tag	Attribute	Description
Weather	id	The MAC Address of the Network OWL
Weather	code	Weather condition code (see below)

WEATHER CODES

Code	Description
113	Clear/Sunny
116	Partly Cloudy
119	Cloudy
122	Overcast
143	Mist
176	Patchy rain nearby
179	Patchy snow nearby
182	Patchy sleet nearby
185	Patchy freezing drizzle nearby
200	Thundery outbreaks
227	Blowing snow
230	Blizzard
248	Fog
260	Freezing fog
263	Patchy light drizzle
266	Light drizzle
281	Freezing drizzle
284	Heavy freezing drizzle
293	Patchy light rain
296	Light rain
299	Moderate rain at times
302	Moderate rain
305	Heavy rain at times
308	Heavy rain
311	Light freezing rain
314	Moderate or Heavy freezing rain
317	Light sleet
320	Moderate or heavy sleet
323	Patchy light snow

326	Light snow
329	Patchy moderate snow
332	Moderate snow
335	Patchy heavy snow
338	Heavy snow
350	Ice pellets
353	Light rain shower
356	Moderate or heavy rain shower
359	Torrential rain shower
362	Light sleet showers
365	Moderate or heavy sleet showers
368	Light snow showers
371	Moderate or heavy snow showers
374	Light showers of ice pellets
377	Moderate or heavy showers of ice pellets
386	Patchy light rain in area with thunder
389	Moderate or heavy rain in area with thunder
392	Patchy light snow in area with thunder
395	Moderate or heavy snow in area with thunder

HEATING DATA PACKET

EXAMPLE PACKET

Network OWL v2.2 or below:

```
<heating id='00A0C914C851'>
  <signal rssi='-61' lqi='48'/>
  <battery level='2730mV'/>
  <temperature until='1359183600' zone='0'>
    <current>22.37</current>
    <required>15.00</required>
  </temperature>
</heating>
```

Network OWL v2.3 or above:

```
<heating ver='2' id='00A0C914C851'>
  <timestamp>1384249792</timestamp>
  <zones>
    <zone id='200027F' last='26'>
      <signal rssi='-87' lqi='48'/>
      <battery level='2240'/>
      <conf flags='0'/>
      <temperature state='0' flags='0' until='1384273800' zone='0'>
        <current>21.30</current>
        <required>15.00</required>
      </temperature>
    </zone>
    <zone id='2000014' last='48'>
      <signal rssi='-58' lqi='48'/>
      <battery level='2960'/>
      <conf flags='0'/>
      <temperature state='0' flags='0' until='1384273800' zone='0'>
        <current>21.87</current>
        <required>15.00</required>
      </temperature>
    </zone>
    ....
  </zones>
</heating>
```

PARAMETERS

From Network OWL version 2.3, the data packet supports multiple heating zones. The <heating> tag contains a <zones> tag, which contains a list of one or more <zone> tags (maximum of 4). Each <zone> tag contains the temperature, battery and signal information, along with the <conf> tag. This tag shows if there is any outstanding configuration yet to be pushed to the heating device.

The temperature tag contains the current room/zone temperature (current) and the required temperature (required). All temperatures are in degrees Celsius.

The 'ver' attribute in the <heating> tag allows applications to determine which format is being used. Currently only version 2 will be seen.

Tag	Attribute	Description
Heating	id	The MAC Address of the Network OWL
Heating	ver	Version of the data packet format. If not present assume v1
Zone	id	Device ID for the heating device
Zone	last	Seconds since the last report was received from this device
Signal	rssi	Receive signal strength (dBm)
Signal	lqi	Link quality (closer to 0 the better)
Battery	level	Battery voltage reading in millivolts
Conf	flags	Flag to show outstanding configuration to be pushed to the device. 0 = no outstanding configuration non-zero = outstanding configuration
Temperature	state	Heating state for the device: 0 = Standby 1 = Comfort (Running) 4 = Comfort (Up To Temperature) 5 = Comfort (Warm Up) 6 = Comfort (Cool Down) 7 = Standby (Running) – Below the standby temperature
Temperature	flags	Heating system flags – Currently undefined.
Temperature	until	Timestamp of the end of the current comfort/standby period
Temperature	Zone	Current active heating zone

HOT WATER DATA PACKET

EXAMPLE PACKET

Network OWL v2.3 and above

```
<hot_water ver='2' id='00A0C914C851'>
  <timestamp>1384249810</timestamp>
  <zones>
    <zone id='200062E' last='2'>
      <signal rssi='-41' lqi='48'/>
      <battery level='2990'/>
      <conf flags='0'/>
      <temperature state='0' flags='0' until='1384725600'>
        <current>21.00</current>
        <required>45.00</required>
        <ambient>21.96</ambient>
      </temperature>
      <humidity>66.13</humidity>
    </zone>
    <zone id='200062F' last='8'>
      <signal rssi='-45' lqi='43'/>
      <battery level='2990'/>
      <conf flags='0'/>
      <temperature state='0' flags='4097' until='1384725600'>
        <current>20.50</current>
        <required>50.00</required>
        <ambient>22.84</ambient>
      </temperature>
      <humidity>53.45</humidity>
    </zone>
    ....
  </zones>
</hot_water>
```

PARAMETERS

The <hot_water> tag contains a <zones> tag, which contains a list of one or more <zone> tags (maximum of 4). Each <zone> tag contains the temperature, battery and signal information, along with the <conf> tag. This tag shows if there is any outstanding configuration yet to be pushed to the hot water device.

The temperature tag contains the current hot water tank temperature (current), the required temperature (required) and the ambient temperature at the installed location (ambient). All temperatures are in degrees Celsius.

The <humidity> tag contains the relative ambient humidity at the installed location in percent.

The ‘ver’ attribute in the <hot_water> tag allows applications to determine which format is being used. Currently only version 2 will be seen.

Tag	Attribute	Description
Hot water	id	The MAC Address of the Network OWL
Hot water	ver	Version of the data packet format.
Zone	id	Device ID for the heating device
Zone	last	Seconds since the last report was received from this device
Signal	rssi	Receive signal strength (dBm)
Signal	lqi	Link quality (closer to 0 the better)
Battery	level	Battery voltage reading in millivolts
Conf	flags	Flag to show outstanding configuration to be pushed to the device. 0 = no outstanding configuration non-zero = outstanding configuration
Temperature	state	Heating state for the device: 0 = Standby 1 = Running 4 = Up To Temperature 5 = Warm Up 6 = Cool Down 7 = Standby (Running) – Below the standby temperature
Temperature	flags	Hot water system flags – Currently undefined.
Temperature	until	Timestamp of the end of the current comfort/standby period
Temperature	Zone	Current active heating zone

RELAYS DATA PACKET

EXAMPLE PACKET

Network OWL v2.3 and above

```
<relays id='443719999999' ver='1'>
  <timestamp>1384249810</timestamp>
  <zones>
    <zone id='20006A1' last='4' relay='1'>
      <signal rssi='-41' lqi='48'/>
      <conf flags='0'/>
      <devices>
        <device address='20006B2' relay='0' rssi='-51'/>
        <device address='20006B3' relay='1' rssi='-56'/>
      </devices>
    </zone>
    <zone id='20006A2' last='4' relay='1'>
      <signal rssi='-41' lqi='48'/>
      <conf flags='0'/>
      <devices>
        <device address='20006A4' relay='0' rssi='-54'/>
        <device address='20006A5' relay='1' rssi='-52'/>
      </devices>
    </zone>
    ....
  </zones>
</relays>
```

PARAMETERS

The <relays> packet contains data relating to any relay units (for intuition-cw) in the system. The packet contains a list of one or more zones, with each zone being a relay unit. For each zone, the data shows if the relay is turned on, the last report time, signal information and configure flags. There is also a list of devices that are paired to this relay unit. Each device includes the device address/id, requested relay state and signal strength (between the device and the relay unit).

Tag	Attribute	Description
Relays	id	The MAC Address of the Network OWL
Relays	ver	Version of the data packet format.
Zone	id	Device ID for the heating device
Zone	last	Seconds since the last report was received from this device
Zone	relay	Relay state for this zone/relay unit. 0 = off 1 = on
Signal	rssi	Receive signal strength (dBm)
Signal	lqi	Link quality (closer to 0 the better)
Conf	flags	Flag to show outstanding configuration to be pushed to the device. 0 = no outstanding configuration non-zero = outstanding configuration
Device	address	Address of the remote heating/hot water device
Device	relay	Requested relay state 0 = off 1 = on
Device	rssi	Receive signal strength (dBm) at the relay unit