Ceylan-Oceanic: Enocean facilities in Erlang

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Dedication: Users and maintainers of the `Ceylan-Oceanic` library.

Abstract: The role of the `Ceylan-Oceanic` library is to provide Erlang-based facilities for the support of the Enocean building automation system.

The latest version of this documentation is to be found at the official Ceylan-Oceanic website (`http://oceanic.esperide.org`).

This documentation is also mirrored here.

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Overview

The Ceylan-Oceanic library provides Erlang-based facilities for the support of the Enocean building automation system.

Ceylan-Oceanic is a rather autonomous part of the Ceylan project, and relies on Myriad. Ceylan-Oceanic can be readily built and run on most Unices, including of course GNU/Linux.

The project repository is located here.

At least a basic knowledge of Erlang is expected in order to use Ceylan-Oceanic.

Testing Ceylan-Oceanic in Two Steps

Now, let's discuss these subjects a bit more in-depth.

Hardware Prerequisites

In terms of Enocean devices, one needs typically:

- any kind of emitter/sensor, for example a rocker button like these ones
- a receiver, typically a USB gateway

Popular USB dongles, which often relies on the TCM 310 chip, include the USB300 one (around 37 Euros in France) or the USB310 one (around 50 Euros in France) that we prefer as it features a SMA connector allowing to connect an external antenna in order to boost emission/reception ranges.

We will rely here on such a configuration.

Operating System Support

Once the USB dongle is connected (here on an Arch Linux box), `lsusb` tells us that it is detected as:

```
Bus 003 Device 009: ID 0403:6001 Future Technology Devices International, Ltd FT232 Se
```

We will interact with this USB gateway as if it was a serial port.

Rather than having it designated by an obscure, potentially changing name (like `/dev/ttyUSB0`, `/dev/ttyUSB1`, etc.), we prefer assigning it a fixed, well-chosen path, like `/dev/ttyUSBEnOcean`.

For that one may define a suitable udev rule, typically stored in `/etc/udev/rules.d/99-enocean.rules`, whose content can simply be:

```
SUBSYSTEM=="tty", ATTRS{idVendor}=="0403", ATTRS{idProduct}=="6001", SYMLINK+="ttyUSBE
```

One may run `udevadm control --reload-rules` to ensure it is taken into account.

Then inserting said dongle should generate log entries that `journalctl -xe` can show, like (timestamps and hostname edited):

```
kernel: usb 3-11: new full-speed USB device number 9 using xhci_hcd
kernel: usb 3-11: New USB device found, idVendor=0403, idProduct=6001, bcdDevice= 6.0
kernel: usb 3-11: New USB device strings: Mfr=1, Product=2, SerialNumber=3
kernel: usb 3-11: Product: FT232R USB UART
kernel: usb 3-11: Manufacturer: FTDI
kernel: usb 3-11: SerialNumber: A600AVJD
mtp-probe[74533]: checking bus 3, device 9: "/sys/devices/pci0000:00/0000:00:14.0/usb3
kernel: ftdi_sio 3-11:1.0: FTDI USB Serial Device converter detected
kernel: usb 3-11: Detected FT232RL
kernel: usb 3-11: FTDI USB Serial Device converter now attached to ttyUSB0
mtp-probe[74533]: bus: 3, device: 9 was not an MTP device
mtp-probe[74548]: checking bus 3, device 9: "/sys/devices/pci0000:00/0000:00:14.0/usb3
mtp-probe[74548]: bus: 3, device: 9 was not an MTP device
```

Software Prerequisites

Ceylan-Oceanic relies on general-purpose services offered by Ceylan-Myriad (implying of course Erlang itself), and on an Erlang driver for serial communication.

We chose erlang-serial for that, and we prefer installing it in user space that way:

```
$ mkdir ~/Software && cd ~/Software
$ git clone https://github.com/tonyg/erlang-serial.git
$ cd erlang-serial
$ make && DESTDIR=. make install
```

Then using erlang-serial will be just a matter of adding it to the code path.

To test it:

```
$ erl -pa $HOME/Software/erlang-serial/erlang/lib/serial-1.1/ebin
Erlang/OTP 25 [erts-13.0] [source] [64-bit] [smp:8:8] [ds:8:8:10] [async-threads:1] [

Eshell V13.0  (abort with ^G)
1> serial:start().
<0.82.0>
```

Perfect!

One may update the *Erlang-serial section* in our GNUmakevars.inc to take into account any other convention.

Run, from the root of Oceanic, `make info-serial` to check that `ERLANG_SERIAL_BASE` points indeed to a directory containing serial's `ebin` directory.

Testing

It is as simple as executing, from the root of the Ceylan-Oceanic clone:

```
# Ensure that Ceylan-Oceanic is built:
$ make all
```

```
$ cd test
$ make oceanic_run

       Running unitary test oceanic_run (third form) from oceanic_test

--> Testing module oceanic_test.

Starting the Enocean test based on the gateway TTY '/dev/ttyUSBEnOcean'.
[debug] Using TTY '/dev/ttyUSBEnOcean' to connect to Enocean gateway, corresponding to
[debug] Stopping serial server <0.84.0>.

--> Successful end of test.

(test finished, interpreter halted)
(command success reported)
```

Support

Bugs, questions, remarks, patches, requests for enhancements, etc. are to be reported to the project interface (typically issues) or directly at the email address mentioned at the beginning of this longer document.

Related Projects

- the Python EnOcean library

Please React!

If you have information more detailed or more recent than those presented in this document, if you noticed errors, neglects or points insufficiently discussed, drop us a line! (for that, follow the Support guidelines).

Ending Word

Have fun with Ceylan-Oceanic!