

1. Introduction

A simple program-client application, which communicates with OpenWeatherMap API and provides weather information for the chosen city.

2. Modules

The program is using three modules, `sys`, `socket` and `json`.

- Module `sys` is used for calling system-specific parameters and functions, such as `sys.argv` and `sys.exit`. These functions are used for program argument processing and immediate program termination.
- Module `socket` is a low-level networking interface, which is used for establishing connection, sending and receiving data to a remote socket.
- Module `json` is a lightweight data interchange format, used for encoding and decoding data from, or into JSON format.

3. Implementation

Firstly, the program loads the needed arguments through `Makefile` and assigns them into variables.

Afterwards a remote connection is made with the host "`api.openweathermap.org`", through port 80, a TCP port used by Hypertext Transfer Protocol.

If succeeded, an encoded GET request is sent, which specifies the API key, requested city, units and the remote host. The message looks like this:

```
"GET /data/2.5/weather?q={}&APPID={}&units=metric HTTP/1.1\r\nHost: {}\r\n\r\n"
```

Response from the host is stored in a variable. These data are then decoded and converted into JSON format. Afterwards the data are printed out in the correct format.

On an unsuccessful connection or a wrong response, the program is terminated with the correct error message.

4. How to use

First of all, a free registration is necessary to acquire an API key. After the registration the program is ready to use.

The client runs with the following command: `make run api_key=<API key> city="<city>"`

Example: `make run api_key=067e0f90f280e1e88deed3bc38d571be city="Brno"`

```
Brno
clear sky
temp:11.86°C
humidity:76%
pressure:1004 hPa
wind-speed:2.6 km/h
wind-deg:100
```