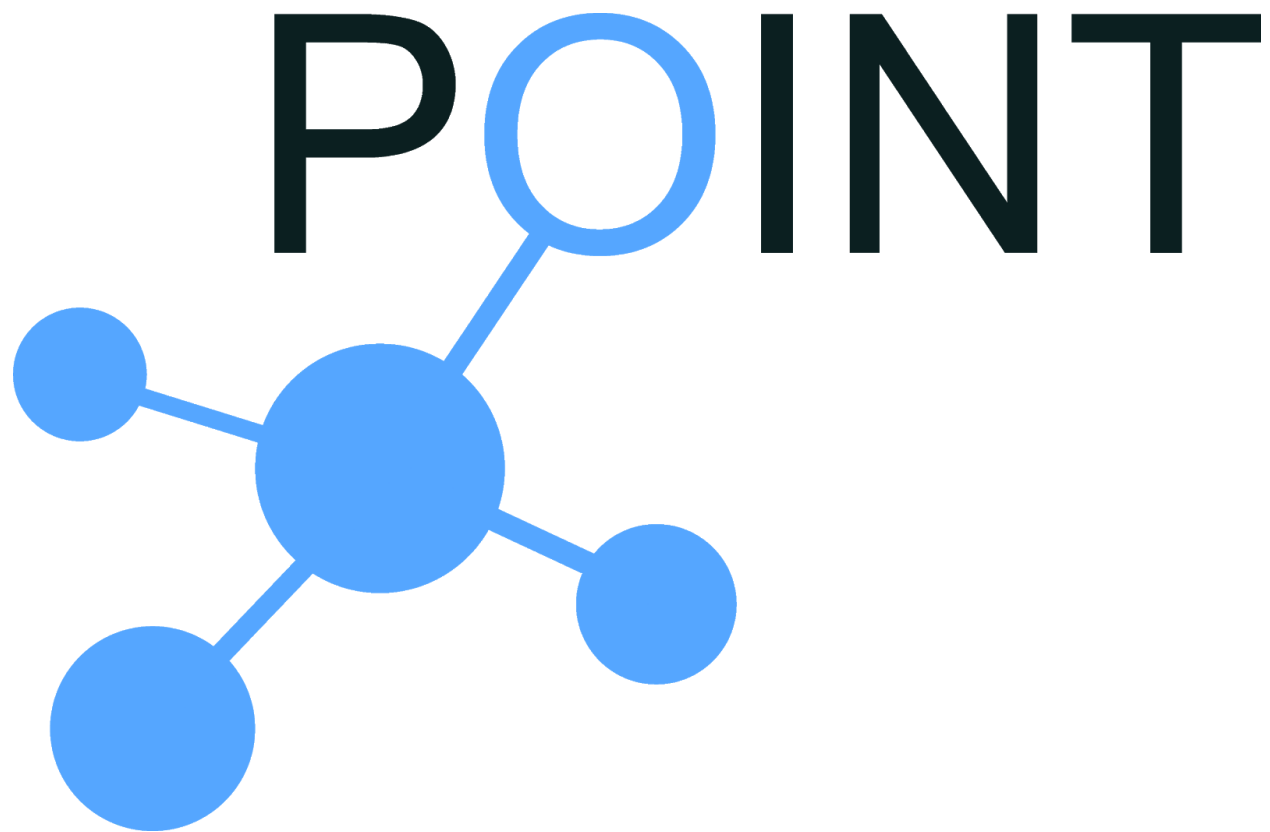


reH2020 iP Over IcN- the betTer IP (POINT)

HowTo-CoAP

Installation and Configuration of the CoAP handler



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1. Introduction

This document describes the steps required to install and configure a CoAP handler that allows the CoAP protocol [RFC7252] to be run over the POINT network in an optimized way.

CoAP handler is located in the *apps/coap* folder. The contents of this folder are:

- core : This folder contains the core code of the CoAP handler
- tools: Contains auxiliary software that can be used for testing purposes
 - coap-apps: Contains the CoAP server implementation and scripts for running coap-clients
 - mininet: Contains a mininet based demo
 - nodered: Node-RED-based GUI for controlling the mininet demo

2. CoAP handler installation for POINT

2.1. Prerequisites

For installing the core files only, the libssl library is required. In a Debian-based system this can be done using the the following command:

```
$ sudo apt-get install libssl-dev
```

For using the auxiliary software the following are required

- libcoap library (available at <https://github.com/obgm/libcoap>)
- mininet network emulator (available at <http://mininet.org/>)
- Node-RED framework (available at <https://github.com/node-red>)

2.2. Build Instructions

The following instructions assume that you have successfully built and installed Blackadder and the Blackadder library.

To build the core files, cd into the core folder and type `make`

To build *libcoap*, execute the following steps:

- `$ git clone https://github.com/obgm/libcoap.git`
- `$ cd libcoap`
- `$ autogen.sh`
- `$./configure --disable-documentation`
- `$ make`
- `$ sudo make install`

To build *tools/coap-apps*, cd into that folder and type `make`

To build mininet, follow the instructions here:

<http://mininet.org/download/#option-2-native-installation-from-source>.

To build Node-RED, execute the following steps:

- `$ git clone https://github.com/node-red/node-red.git`
- `$ cd node-red`
- `$ npm install`
- `$ npm run build`
- `$ cd nodes`
- `$ git clone https://github.com/Ell-i/node-red-contrib-coap`
- `$ cd node-red-contrib-coap`
- `$ npm install`
- `$ cd ..`

Node-RED dashboard installation

- `$ cd ~/.node-red`
- `$ npm i node-red-dashboard`

3. Configuration and running

Server-side CoAP handlers that are connected to the CoAP servers are configured with a configuration file that includes tuples of the form "*CoAP server URI*" "*IPv6 address of the CoAP server*". The configuration file is located in the *tools/mininet/config/Demo* folder and it has the following structure:

```
coap://point.testbed.riot fd88::1
```

A URI can be mapped to multiple IPv6 addresses. With this the group communication is achieved. For example:

```
coap://floor1.building6 fe80::da80:39ff:fe02:c0c7
```

```
coap://floor1.building6 fe80::da80:39ff:fe02:c0e7
```

CoAP handlers that are not connected to a CoAP server do not need any configuration. The handler is executed using the command:

```
$ pointcoap <configuration file>
```

A CoAP client that wants to access a resource over ICN should use the IP address of a CoAP handler as a CoAP proxy. If *libcoap* is used, then the following command can be used:

```
$ coap-client -P <handler IP> -T abcd <CoAP URI>
```

Group communication works natively using multicast if there are multiple IP addresses pointing to the same name. For example to set on lights (use PUT request with a CoAP resource name “a/D2” and value “1”) in all devices on the “floor1”, the following command is used:

```
$ coap-client -m PUT -P <handler IP> -T abcd  
coap://floor1.building6/a/D2 -e 1
```

The CoAP observe [RFC7641] allows a client to observe a resource on a CoAP server. CoAP server will send updates to the client either periodically or when the value of the resource changes. If there are multiple clients observing the same CoAP resource, server-side CoAP handler (NAP) establishes only one observe relationship with the server, and messages are delivered to multiple clients using multicast over the POINT ICN network. To observe the resource “a/A2” for 30 seconds, the following command is used:

```
$ coap-client -s 30 -P <handler IP> -T abcd  
coap://sensor1.floor1.west.building6/a/A2
```