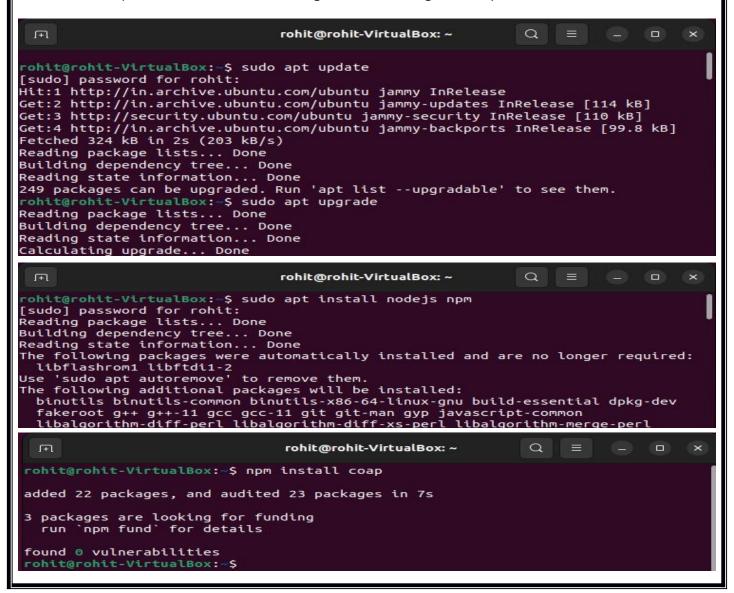
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CPS System Design - CSE2034

HTTP Server Creation

Experiment - 2

There is a chemical factory that do research and development in fertilisers. They deploy various sensors to monitor the air quality inside the factory premises and near to the plant. You as a CPS engineer, need to develop a CoAP Client device that fetches the values of the following sensors namely: Particle Matter, Hydro Carbons, Carbon Monoxide, Nitrous Oxide and Carbon Di oxide. You need to do the research on the permissible levels of all these sensors and device a NodeJS script and test the client using either Cu Plugin or any terminal based CoaP Client.



js file

```
coap.js
  Open ~
                                                                             Save
                                                                                     \equiv
                                                                                              1
 1 var coap = require('coap'); //to include CoAP library
 2 var portNum = 5683;
 4 //define a random fucntion to send random int values
 5 function randInt(min, max){
           return (Math.random()*(max-min)+min).toFixed(2);
 7 }
 8
 9 coap.createServer(function (req, res){
10
           console.info("Client request is %s", req.url);
11
12
           switch(req.url){
13
                   case "/co2":
                           displayOut(res, {'Carbon Dioxide':randInt(1000, 2000)+' ppm'})
14
15
                           break;
16
                   case "/pm":
17
18
                           displayOut(res, {'Particulate Matter':randInt(0, 2.5)+' ppm'})
19
                           break;
20
21
                   case "/hc":
22
                           displayOut(res, {'Hydrocarbons':randInt(0, 1500)+' ppm'})
23
                           break;
24
25
                   case "/co":
                           displayOut(res, {'Carbon Monoxide':randInt(0, 50)+' ppm'})
26
27
                           break;
28
29
                   case "/nox":
30
                           displayOut(res, {'Nitrous Oxide':randInt(0, 0.3)+' ppm'})
31
                           break:
32
33 }).listen(portNum);
34
35 console.log("CoAP server started at port %s.", portNum);
36
37 function displayOut(res, content)
38
           if(content){
                   res.setOption('Content-Format', 'application/json');
39
40
                   res.code="2.05";
41
                   res.end(JSON.stringify(content));
42
           }else{
43
                   res.code="4.04";
44
                   res.end();
45
           }
46
```

Using CU for Chrome Payload Incoming Rendered Outgoing {"Carbon Monoxide": "26.55 ppm"} coap://localhost:5683/co Payload Incoming Rendered Outgoing {"Carbon Dioxide":"1447.34 ppm"} coap://localhost:5683/co2 Payload Incoming Rendered Outgoing {"Particulate Matter": "1.68 ppm"} coap://localhost:5683/pm Payload Incoming Rendered Outgoing {"Nitrous Oxide":"0.26 ppm"}

coap://localhost:5683/nox



coap://localhost:5683/hc

Using Terminal

Client Side

```
rohit@rohit-VirtualBox: ~/node-v18.13.0-linux-x64/bin
 Ħ.
rohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$ coap-client -m get -t json
coap://localhost:5683/co2
{"Carbon Dioxide":"1880.86 ppm"}
rohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$ coap-client -m get -t json
coap://localhost:5683/pm
{"Particulate Matter":"0.52 ppm"}
rohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$ coap-client -m get -t json
coap://localhost:5683/hc
{"Hydrocarbons":"1208.41 ppm"}
rohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$ coap-client -m get -t json
coap://localhost:5683/co
{"Carbon Monoxide":"13.86 ppm"}
rohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$ coap-client -m get -t json
coap://localhost:5683/nox
{"Nitrous Oxide":"0.24 ppm"}
ohit@rohit-VirtualBox:~/node-v18.13.0-linux-x64/bin$
```

Server Side

```
rohit@rohit-VirtualBox: ~/node-v18.13.0-linux-x64/bin Q = - - ×

rohit@rohit-VirtualBox: ~/node-v18.13.0-linux-x64/bin$./node /home/rohit/coap.js

CoAP server started at port 5683.

Client request is /co2

Client request is /pm

Client request is /hc

Client request is /co

Client request is /co

Client request is /nox
```