

3.2.2.5 - Install and Configure IoT Devices

Part 1. Setting up the Home Network

Step 1: Set up the wired network

Connect FastEthernet on Home Switch to Home Gateway using a copper straight-through cable.

Connect FastEthernet0 on PC -> FastEthernet on HomeSwitch

Set IPConfig of PC to DHCP

Step 2: Set up the wireless network

Home Gateway -> Config -> Internet -> select DHCP

Home Gateway -> Wireless -> change SSID to MyHome Gateway, auth to WPA2-PSK, use CiscIoT as passphrase

Laptop -> Desktop -> PC Wireless ->

Connect -> select MyHomeGateway -> connect

Step 3: Connect the IoT devices to the network

Connect Coffee Pot to FastEthernet using copper straight-through cable

Coffee Pot -> Config -> FastEthernet0 -> select DHCP

Lamp/Ceiling Fan -> Config -> Wireless0 -> connect to MyHomeGateway

Part 2. Interacting with IoT devices

Step 1: Acces the IoT devices locally

Click Alt + Lamp a few times, how many settings does the lamp have: 3

Alt + Lamp Switch: 2

Alt + Ceiling Fan: 3, Switch: 2

Alt + Coffee Pot: 2, Swtich: 2

3.2.2.5 - Install and Configure IoT Devices (cont)

Step 2: Configure the IoT devices for remote access

Lamp/Ceiling Fan/Coffee Pot -> Config -> IoE Server heading -> Remote server:

Server address: www.register.pka

Username: admin

Password: admin

-> connect

Step 3: Access the IoT devices remotely

Laptop/Smartphone -> Desktop ->

Webbrowser -> www.register.pka -> login with admin:admin

Devices can be controlle

Coffee Pot ins Internet hängen

Netcat starten: `nc -l 1234`

Javascript Code beim Coffee Pot unter Advanced -> Programming einfügen:

```
var state = 0;
var client = new RealTCPClient();
var coffeestatus = ["Off", "On"];
function setup() {
  // 17 Zeilen ...
  setState(state);
  client.connect("ip", 1234);
}
// 10 Zeilen ...
function setState(newState) {
  // 10 Zeilen; client.send als letzte Zeile
  einfügen:
```

Coffee Pot ins Internet hängen (cont)

```
client.send(getName()+" "+coffeestatus[s-
tate)+"\n");
}
```

Netcat bekommt nun (nach Neustart und Cofee Pot Stop/Start/Altclick) Nachrichten

Mozilla Webthings Gateway

Lubuntu in VM Winstallieren, Firefox in der VM starten, Mozilla Webgateway installieren und starten, im Browser auf Configseite gehen.

Codeexample

```
Dependency installieren: pip
install webthing
from __future__ import division
from webthing import (Action,
Event, Property, SingleThing,
Thing, Value,
                                WebThingServer)
import logging
import time
import uuid
# Ein Event dass Überhitzung
indiziert
class OverheatedEvent(Event):
    def __init__(self, thing,
data):
        Event.__init__(self,
thing, 'overheated', data=data)
# eine Action, welche die Lampe
"faden" lässt
class FadeAction(Action):
    def __init__(self, thing,
input_):
```



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Codeexample (cont)

```

    Action.__init__(self,
        uuid.uuid4().hex, thing, 'fade',
        input_=input_)
    def perform_action(self):
        time.sleep(self.input-
            ['duration'] / 1000)
        self.thing.set_proper-
            ty('brightness', self.input['-
                brightness'])
        self.thing.add_event(-
            OverheatedEvent(self.thing,
                102))
    def make_thing():
        # lamp thing erstellen, kann
        ein/aus geschalten werden, hat
        verschiedene properties
        thing = Thing(
            'urn:dev:ops:my-lamp--
            1234',
            'My Lamp',
            ['OnOffSwitch',
            'Light'],
            'A web connected lamp'
        )
        thing.add_property(
            Property(thing,
                'on',
                Value(True),
                metadata={
                    '@type':
                    'OnOffProperty',
                    'title':
                    'On/Off',
                    'type':
                    'boolean',
                    'descript-
                    ion': 'Whether the lamp is
                    turned on',
                })
            )
        thing.add_property(

```

Codeexample (cont)

```

        Property(thing,
            'brightness',
            Value(50),
            metadata={
                '@type':
                'BrightnessProperty',
                'title':
                'Brightness',
                'type':
                'integer',
                'descript-
                ion': 'The level of light from
                0-100',
                'minimum':
                0,
                'maximum':
                100,
                'unit':
                'percent',
            })
        thing.add_available_action(
            'fade',
            {
                'title': 'Fade',
                'description': 'Fade
                the lamp to a given level',
                'input': {
                    'type':
                    'required': [
                        'brigh-
                        tness',
                        'duration',
                    ],
                    'properties': {
                        'brigh-
                        tness': {
                            'type':
                            'integer',
                            'mi-
                            nimum': 0,
                            'ma-
                            ximum': 100,

```

Codeexample (cont)

```

                'unit':
                'percent',
            },
            'duration':
            {
                'type':
                'integer',
                'mi-
                nimum': 1,
                'unit':
                'milliseconds',
            },
            FadeAction)
        thing.add_available_event(
            'overheated',
            {
                'description':
                'The lamp has
                exceeded its safe operating
                temperature',
                'type': 'number',
                'unit': 'degree
                celsius',
            })
        return thing
    def run_server():
        # thing erstellen
        thing = make_thing()
        # webserver starten
        # If adding more than one
        thing, use MultipleThings() with
        a name.

```



Codeexample (cont)

```
# In the single thing case, the thing's
name will be broadcast.
server = WebThingServer(SingleThing(thing),
port=8888)
try:
    logging.info('starting the server')
    server.start()
except KeyboardInterrupt:
    logging.info('stopping the server')
    server.stop()
    logging.info('done')
if __name__ == '__main__':
    logging.basicConfig(
        level=10,
        format="%(asctime)s %(filename)s:%(-
lineno)s %(levelname)s %(message)s"
    )
    # server starten
    run_server()
```

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