Smart Thermostat

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Description

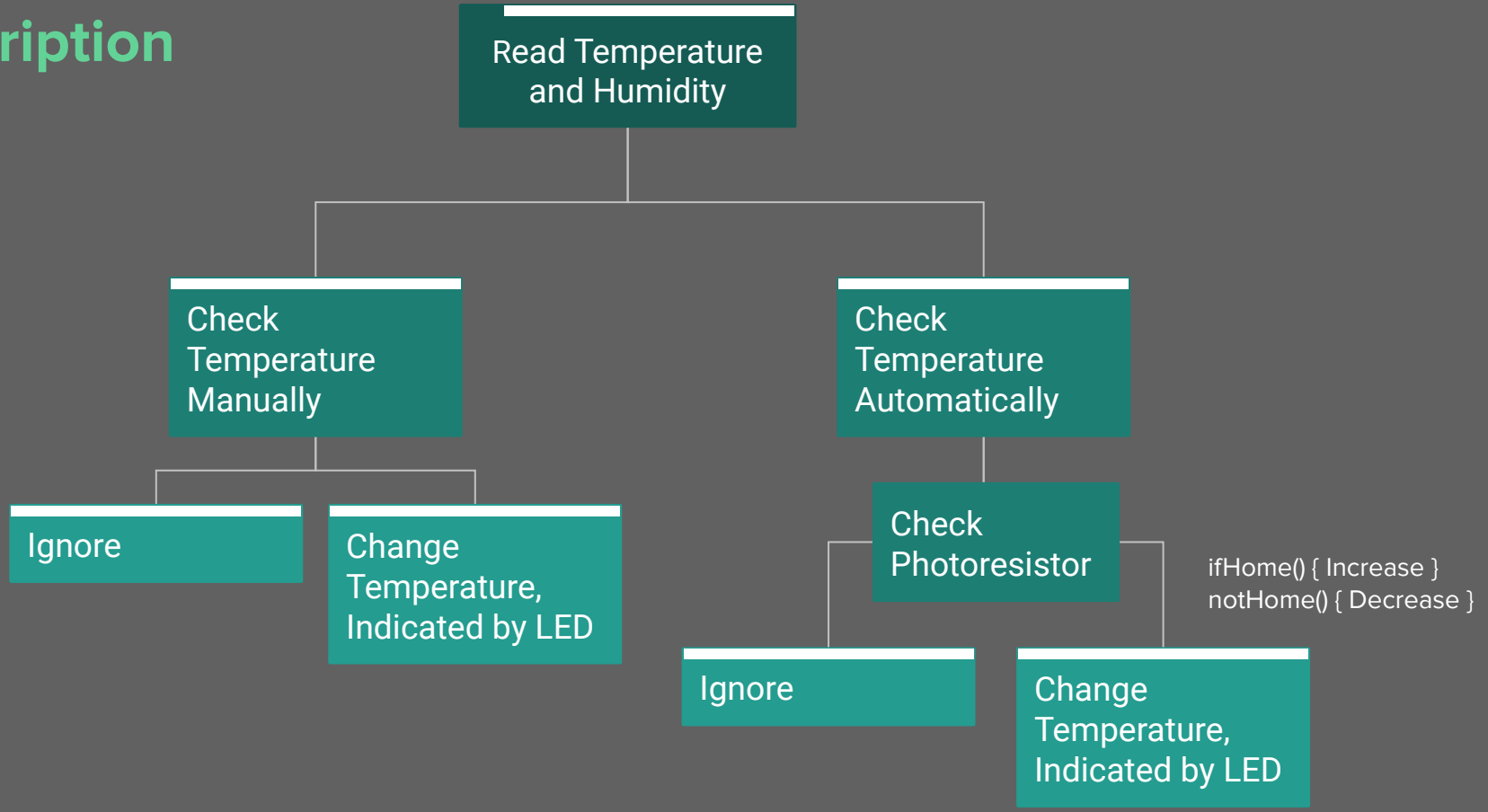
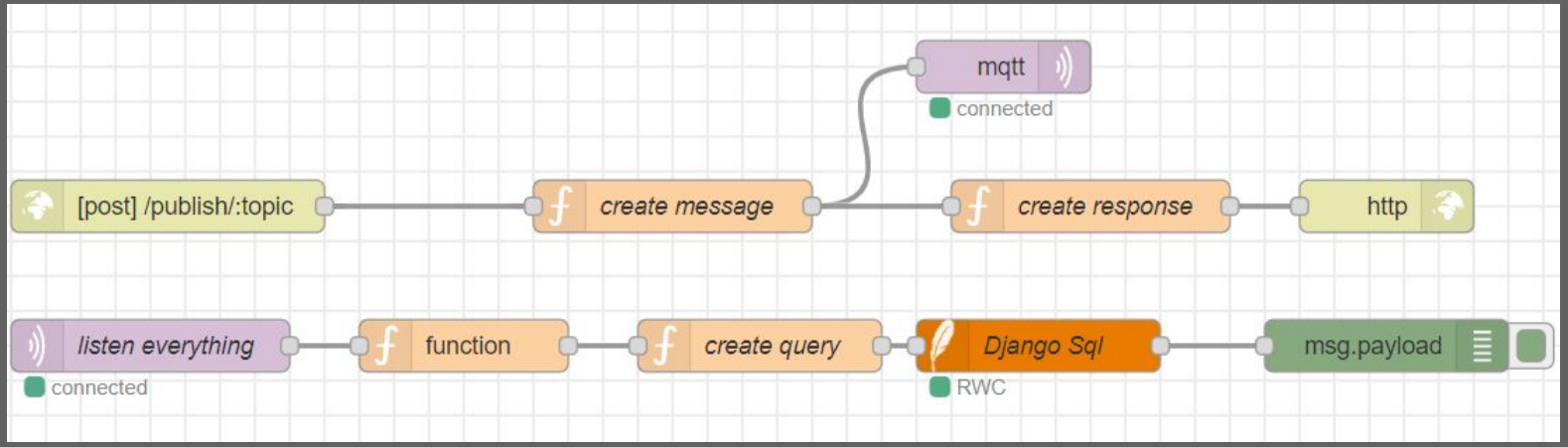


Figure 1. Process Specification Diagram

Sensor → Backend Communication




```
httpsClient.print(String("POST ") + Link + " HTTP/1.1\r\n" +
             "Host: " + host + "\r\n" +
             "Content-Type: application/x-www-form-urlencoded"+ "\r\n" +
             "Content-Length: " +len + "\r\n\r\n" +
             string11 + "\r\n" +
             "Connection: close\r\n\r\n");

Serial.println("request sent");

while (httpsClient.connected()) {
  String line = httpsClient.readStringUntil('\n');
  if (line == "\r") {
    Serial.println("headers received");
    break;
  }
```

Node-Red ↑

← NodeMCU

Django API →

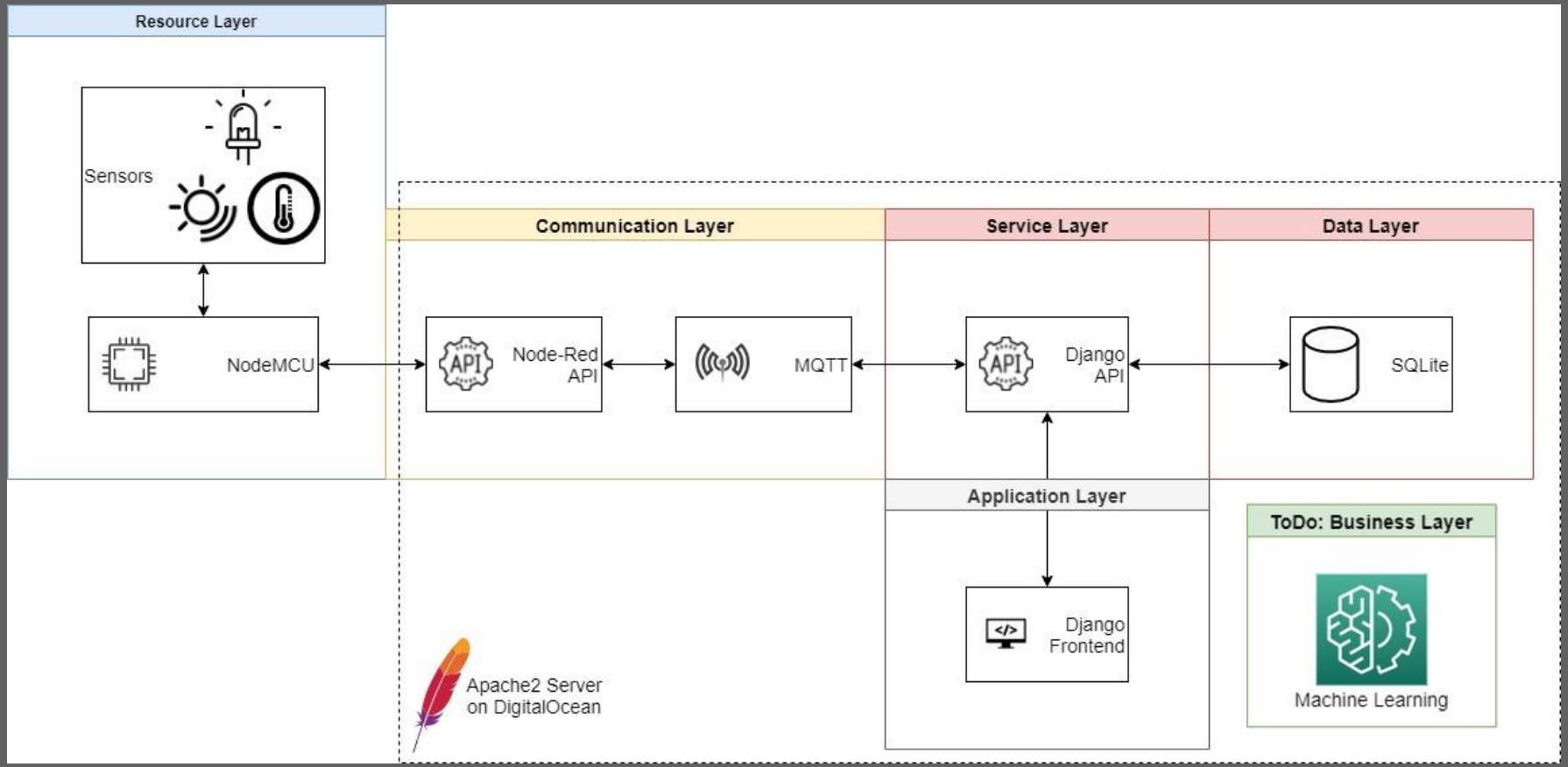
Condition List

`GET` /api/myapp/

```
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[
    {
        "temperature": "12",
        "humidity": "13",
        "home": true
    },
```

Architecture Diagram



Design Decisions

- **Security** vs Development Time/Cost !!!!
- Communication Protocols for Constrained Hardware

```
# secure open port for localhost only
listener 1883 localhost
# listen on secure connection with our SSL certificates
listener 8883
certfile /etc/mosquitto/certs/cert.pem
cafile /etc/mosquitto/certs/chain.pem
keyfile /etc/mosquitto/certs/privkey.pem
```

Demonstration