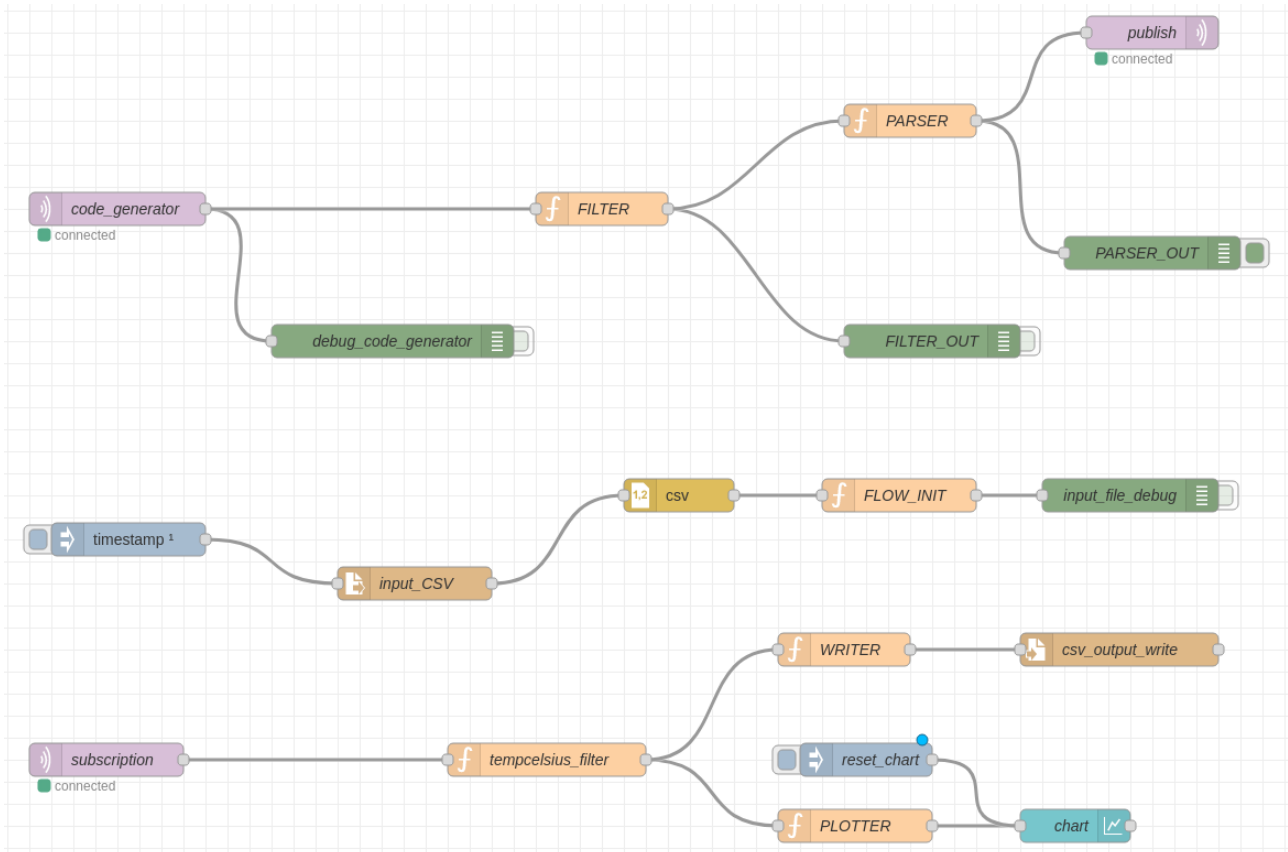


IoT 2023 CHALLENGE2

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NOTE: All the files in the flow are referred with a local machine path.

Node-red Flow



- **code_generator**: subscribes to the topic "polimi/challenge_2/2023/id_code_generator"
- **FILTER**: detailed below
- **PARSER**: detailed below
- **Publish**: publish the various Publish Messages Payload to the topic "/polimi/iot2023/challenge2/10700658"
- **Timestamp**: at the beginning of the deploy dictates the input_CSV to read the file
- **input_scv**: read the input file
- **csv**: parse the input csv file
- **FLOW_INIT**: detailed below
- **Subscription**: subscribes to the topic "/polimi/iot2023/challenge2/10700658" to receive the messages that are published
- **tempcelsius_filter**: Filters the payloads of type temperature and unit "C"
- **WRITER**: prepare the payload to be appended to the .csv output file.
- **csv_output_write**: write to the output file called "10700658_1061806.csv"
- **Plotter**: extract the upper bound from the range array and gives it to the **chart**

Filter Function Node

```
Name FILTER

Setup On Start On Message On Stop

1 const file = global.get("fileGlobal");
2 const counter = global.get("messageCounter");
3
4 if(counter > 99) {
5     msg.payload = "FINISHED";
6     return msg; //if counter is greater than 99 ignore
7 }
8
9 if(!file) {
10    msg.payload = "NOTREADY";
11    return msg;
12 }
13
14 if(msg.payload.id) { // so that wrong formatted code are not considered
15
16     global.set("messageCounter",counter+1); // increment global counter
17
18     const lastDigit = 658;
19     const id = msg.payload.id;
20
21     const frameNumber = (lastDigit + parseInt(id)) % 7711;
22     console.log(lastDigit, id, frameNumber);
23     if(frameNumber!=0) {
24         msg.payload = file[frameNumber-1];
25         msg.payload.previousID = id;
26         return msg;
27     }
28 }
```

It reads the file value and the counter. If the counter exceeds the limit, then it returns a FINISHED message so that the Parser knows to not process the message. Similarly in the case that the file has not been read. Otherwise, it processes the message, increments the counter, extract the packets with the calculated frame number and pass it to the parser.

Parser Function Node

```
1 if (msg.payload != "NOTREADY" && msg.payload != "FINISHED") {
2     //todo: should parse the msg payload and return couples publish, payload
3
4     const messages = msg.payload["Info"]; // messages
5     let payloads = msg.payload["Message"]; // payloads
6
7     const publishMessages = messages.split(",").filter(str => str.startsWith("Publish Message"))
8
9     let emptyPublishPayloads = publishMessages.length;
10
11     const previousID = msg.payload.previousID;
12
13     if(payloads) {
14         // check for malformed packets
15         const lastClosedBrackets = payloads.lastIndexOf(")");
16         const lastOpenBrackets = payloads.lastIndexOf("(");
17         let malformed = "";
18
19         if (lastClosedBrackets < lastOpenBrackets) {
20             malformed = payloads.slice(lastOpenBrackets, payloads.length);
21             payloads = payloads.slice(0,lastOpenBrackets-1);
22         }
23
24         const parsedPayloads = JSON.parse('[' + payloads + ']');
25         emptyPublishPayloads -= parsedPayloads.length;
26         parsedPayloads.forEach(payload => {
27             msg.payload = {
28                 "timestamp": Date.now().toString(), "id": previousID, "payload": JSON.stringify(payload)
29             };
30             node.send(msg);
31         })
32         if(malformed.length > 0) {
33             emptyPublishPayloads -= 1; // it does count as a non-empty payload
34             msg.payload = {"timestamp": Date.now().toString(), "id": previousID, "payload": malformed};
35             node.send(msg);
36         }
37     }
38
39     for(let i=0;i<emptyPublishPayloads;i++) {
40         msg.payload = {
41             "timestamp": Date.now().toString(), "id": previousID, "payload": ""
42         };
43         node.send(msg);
44     }
45 }
```

It counts the Publish Messages (let's say N), the Payloads (let's say M) and the malformed payload (at most 1). Then send M payloads, N-M (-1 if a malformed payload is present) empty payloads and the malformed payload if present.

FLOW_INIT Node

Name

FLOW_INIT

Setup

On Start

On Message

On Stop

```
1 global.set("fileGlobal",msg.payload); // save the parsed input file in a global variable
2 global.set("messageCounter",0); // init the counter
3 return msg;
```

Final Run

```
START
{"timestamp":"1682157059753","id":"3063","payload":{"unit":"C","long":80,"description":"Room Temperature","lat":87,"range":[8,44],"type":"temperature"}}
{"timestamp":"1682157064682","id":"4441","payload":{"unit":"K","long":86,"description":"Room Temperature","lat":56,"range":[0,34],"type":"temperature"}}
{"timestamp":"1682157069784","id":"5288","payload":{"unit":"F","long":90,"description":"Room Temperature","lat":82,"range":[4,37],"type":"temperature"}}
{"timestamp":"1682157074801","id":"2353","payload":{"unit":"C","long":97,"description":"Room Temperature","lat":56,"range":[9,60],"type":"temperature"}}
{"timestamp":"1682157079722","id":"5687","payload":{"description":"Room Temperature","unit":"K","type":"temperature","range":[1,33],"lat":71,"long":75}}
{"timestamp":"1682157084738","id":"5224","payload":{"unit":"F","long":54,"description":"Room Temperature","lat":59,"range":[3,57],"type":"temperature"}}
{"timestamp":"1682157094770","id":"3006","payload":{"unit":"F","long":97,"description":"Room Temperature","lat":51,"range":[8,55],"type":"temperature"}}
{"timestamp":"1682157104809","id":"6888","payload":{"description":"Room Temperature","long":94,"range":[8,44],"lat":100,"type":"temperature","unit":"C"}}
{"timestamp":"1682157109828","id":"4484","payload":{"unit":"K","long":43,"description":"Room Temperature","lat":100,"range":[2,31],"type":"temperature"}}
{"timestamp":"1682157114737","id":"3813","payload":{"unit":"F","long":43,"description":"Room Temperature","lat":48,"range":[10,43],"type":"temperature"}}
{"timestamp":"1682157119725","id":"31","payload":{"unit":"K","long":46,"description":"Room Temperature","lat":71,"range":[5,40],"type":"temperature"}}
{"timestamp":"1682157124778","id":"5607","payload":{"unit":"F","long":41,"description":"Room Temperature","lat":98,"range":[6,33],"type":"temperature"}}
{"timestamp":"1682157129792","id":"4502","payload":{"unit":"K","long":100,"description":"Room Temperature","lat":81,"range":[4,34],"type":"temperature"}}
{"timestamp":"1682157134849","id":"368","payload":{"unit":"C","long":64,"description":"Room Temperature","lat":91,"range":[8,34],"type":"temperature"}}
{"timestamp":"1682157139884","id":"575","payload":{"unit":"K","long":60,"description":"Room Temperature","lat":95,"range":[7,31],"type":"temperature"}}
{"timestamp":"1682157149902","id":"6180","payload":""}
{"timestamp":"1682157154919","id":"4564","payload":{"unit":"K","long":81,"description":"Room Temperature","lat":62,"range":[7,59],"type":"temperature"}}
{"timestamp":"1682157159888","id":"5126","payload":{"unit":"K","long":44,"description":"Room Temperature","lat":51,"range":[2,42],"type":"temperature"}}
{"timestamp":"1682157164923","id":"449","payload":{"unit":"F","long":87,"description":"Room Temperature","lat":73,"range":[9,43],"type":"temperature"}}
{"timestamp":"1682157169941","id":"5607","payload":""}
{"timestamp":"1682157204959","id":"2340","payload":{"unit":"F","long":56,"description":"Room Temperature","lat":62,"range":[10,32],"type":"temperature"}}
{"timestamp":"1682157209973","id":"4877","payload":{"unit":"F","long":52,"description":"Room Temperature","lat":53,"range":[10,48],"type":"temperature"}}
{"timestamp":"1682157214993","id":"870","payload":""}
{"timestamp":"1682157219969","id":"6843","payload":{"description":"Room Temperature","long":76,"range":[2,55],"lat":81,"type":"temperature","unit":"F"}}
{"timestamp":"1682157224921","id":"2179","payload":{"unit":"F","long":41,"description":"Room Temperature","lat":98,"range":[6,33],"type":"temperature"}}
{"timestamp":"1682157229941","id":"4120","payload":{"unit":"C","long":47,"description":"Room Temperature","lat":81,"range":[3,50],"type":"temperature"}}
{"timestamp":"1682157230815","id":"4151","payload":""}
{"timestamp":"1682157235829","id":"3023","payload":{"unit":"K","long":64,"description":"Room Temperature","lat":73,"range":[5,31],"type":"temperature"}}
{"timestamp":"1682157236496","id":"5741","payload":{"description":"Room Temperature","unit":"F","type":"temperature","range":[8,47],"lat":79,"long":71}}
{"timestamp":"1682157236983","id":"2222","payload":{"unit":"C","long":85,"description":"Room Temperature","lat":56,"range":[1,31],"type":"temperature"}}
{"timestamp":"16821572375001","id":"6190","payload":{"description":"Room Temperature","unit":"F","type":"temperature","range":[10,60],"lat":74,"long":67}}
{"timestamp":"16821572385036","id":"1077","payload":{"unit":"C","long":64,"description":"Room Temperature","lat":43,"range":[8,59],"type":"temperature"}}
{"timestamp":"16821572390054","id":"3873","payload":{"unit":"F","long":82,"description":"Room Temperature","lat":94,"range":[2,58],"type":"temperature"}}
{"timestamp":"1682157305107","id":"4404","payload":{"unit":"F","long":100,"description":"Room Temperature","lat":49,"range":[9,37],"type":"temperature"}}
{"timestamp":"1682157310022","id":"5955","payload":""}
{"timestamp":"1682157320058","id":"706","payload":{"unit":"F","long":86,"description":"Room Temperature","lat":51,"range":[3,40],"type":"temperature"}}
{"timestamp":"1682157325075","id":"2597","payload":{"unit":"F","long":49,"description":"Room Temperature","lat":84,"range":[7,35],"type":"temperature"}}
{"timestamp":"1682157330195","id":"4077","payload":""}
{"timestamp":"1682157335110","id":"2549","payload":{"unit":"F","long":96,"description":"Room Temperature","lat":56,"range":[6,36],"type":"temperature"}}
{"timestamp":"1682157340121","id":"3719","payload":{"unit":"K","long":89,"description":"Room Temperature","lat":83,"range":[1,55],"type":"temperature"}}
{"timestamp":"1682157345079","id":"3470","payload":""}
{"timestamp":"1682157370132","id":"2174","payload":{"unit":"F","long":48,"description":"Room Temperature","lat":50,"range":[10,47],"type":"temperature"}}
{"timestamp":"1682157375149","id":"3572","payload":{"unit":"F","long":96,"description":"Room Temperature","lat":80,"range":[10,42],"type":"temperature"}}
{"timestamp":"1682157380269","id":"5966","payload":{"description":"Room Temperature","unit":"F","type":"temperature","range":[0,42],"lat":98,"long":70}}
{"timestamp":"1682157385185","id":"474","payload":{"unit":"F","long":83,"description":"Room Temperature","lat":99,"range":[4,47],"type":"temperature"}}
{"timestamp":"1682157395217","id":"989","payload":{"unit":"C","long":98,"description":"Room Temperature","lat":87,"range":[5,60],"type":"temperature"}}
{"timestamp":"1682157400340","id":"6476","payload":{"description":"Room Temperature","long":97,"range":[5,47],"lat":64,"type":"temperature","unit":"K"}}
{"timestamp":"1682157435249","id":"4038","payload":{"unit":"K","long":51,"description":"Room Temperature","lat":42,"range":[10,45],"type":"temperature"}}
{"timestamp":"1682157440277","id":"1729","payload":{"unit":"K","long":65,"description":"Room Temperature","lat":47,"range":[7,37],"type":"temperature"}}
{"timestamp":"1682157455227","id":"1290","payload":{"unit":"K","long":85,"description":"Room Temperature","lat":72,"range":[5,58],"type":"temperature"}}
{"timestamp":"1682157465262","id":"1122","payload":{"unit":"F","long":84,"description":"Room Temperature","lat":62,"range":[1,42],"type":"temperature"}}
{"timestamp":"1682157475299","id":"1411","payload":{"unit":"C","long":68,"description":"Room Temperature","lat":41,"range":[8,41],"type":"temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"unit":"C","lat":58,"type":"temperature","description":"Room Temperature","long":93,"range":[4,34]}}
{"timestamp":"1682157480316","id":"5075","payload":{"unit":"C","lat":94,"type":"temperature","description":"Room Temperature","long":45,"range":[3,51]}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":84,"long":43,"unit":"F","range":[2,56],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":95,"long":42,"unit":"C","range":[8,32],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":42,"long":68,"unit":"C","range":[4,47],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":55,"long":67,"unit":"C","range":[8,46],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"unit":"F","lat":77,"type":"temperature","description":"Room Temperature","long":76,"range":[1,35]}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":97,"long":72,"unit":"K","range":[0,54],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"type":"temperature","lat":75,"long":59,"unit":"K","range":[9,39],"description":"Room Temperature"}}
{"timestamp":"1682157480316","id":"5075","payload":{"unit":"F","long":54,"description":"Room Temperature","lat":59,"range":[0,40],"type":"temperature"}}
{"timestamp":"1682157485333","id":"3005","payload":{"unit":"F","long":92,"description":"Room Temperature","lat":53,"range":[6,35],"type":"temperature"}}
{"timestamp":"1682157490243","id":"3788","payload":{"unit":"K","long":90,"description":"Room Temperature","lat":81,"range":[9,39],"type":"temperature"}}
{"timestamp":"1682157495259","id":"6052","payload":{"type":"temperature","lat":97,"long":91,"unit":"C","range":[2,57],"description":"Room Temperature"}}
{"timestamp":"1682157505404","id":"1437","payload":""}
{"timestamp":"1682157510319","id":"7487","payload":{"unit":"K","long":54,"description":"Room Temperature","lat":48,"range":[9,52],"type":"temperature"}}
{"timestamp":"1682157515336","id":"4502","payload":{"unit":"K","long":100,"description":"Room Temperature","lat":81,"range":[4,34],"type":"temperature"}}
{"timestamp":"1682157520257","id":"5961","payload":{"description":"Room Temperature","unit":"C","type":"temperature","range":[7,33],"lat":59,"long":92}}
{"timestamp":"1682157540267","id":"6658","payload":{"description":"Room Temperature","long":55,"range":[1,35],"lat":45,"type":"temperature","unit":"F"}}
END
```