Irem Info Bordeaux

Node-Red pour IoT

(via Raspberry Pi)

Christie Vassilian - 13 janvier 2021

Planning Présentation

Node-RED

1. **Node-Red, c'est quoi ?**
   architecture & fonctionnement
2. **Montage Simple mais Efficace**
   premiers flows IoT pour comprendre
3. **Mini-Projet plus élaboré**
   exemples intéressants IoT
4. **Node-Red, une communauté**
   où trouver des explications ou du matériel sur Node-Red

QUESTIONS ECHANGES AU FIL DE L'H2O

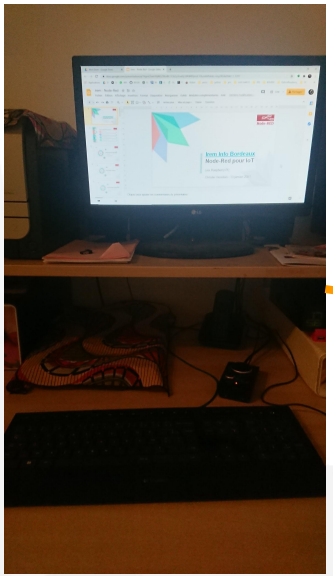
c’est quoi Node-Red

- Pi à distance : RealVNC
- architecture Node-Red
- fonctionnement sous Pi

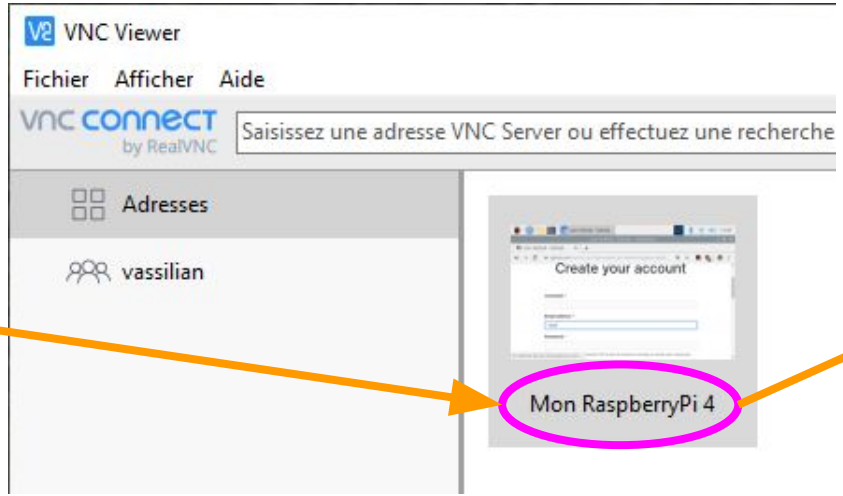
Prise à distance du Pi

via RealVNC

ORDI FIXE

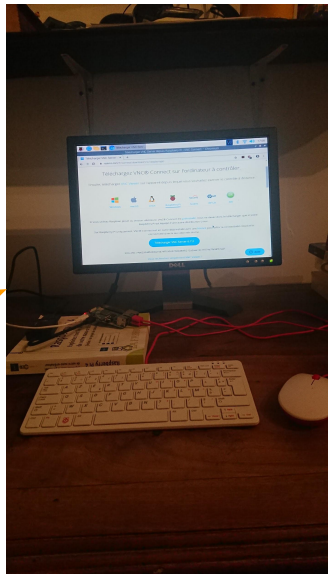


VNC Viewer



utile pour piloter le pi
(qui peut être sans écran)

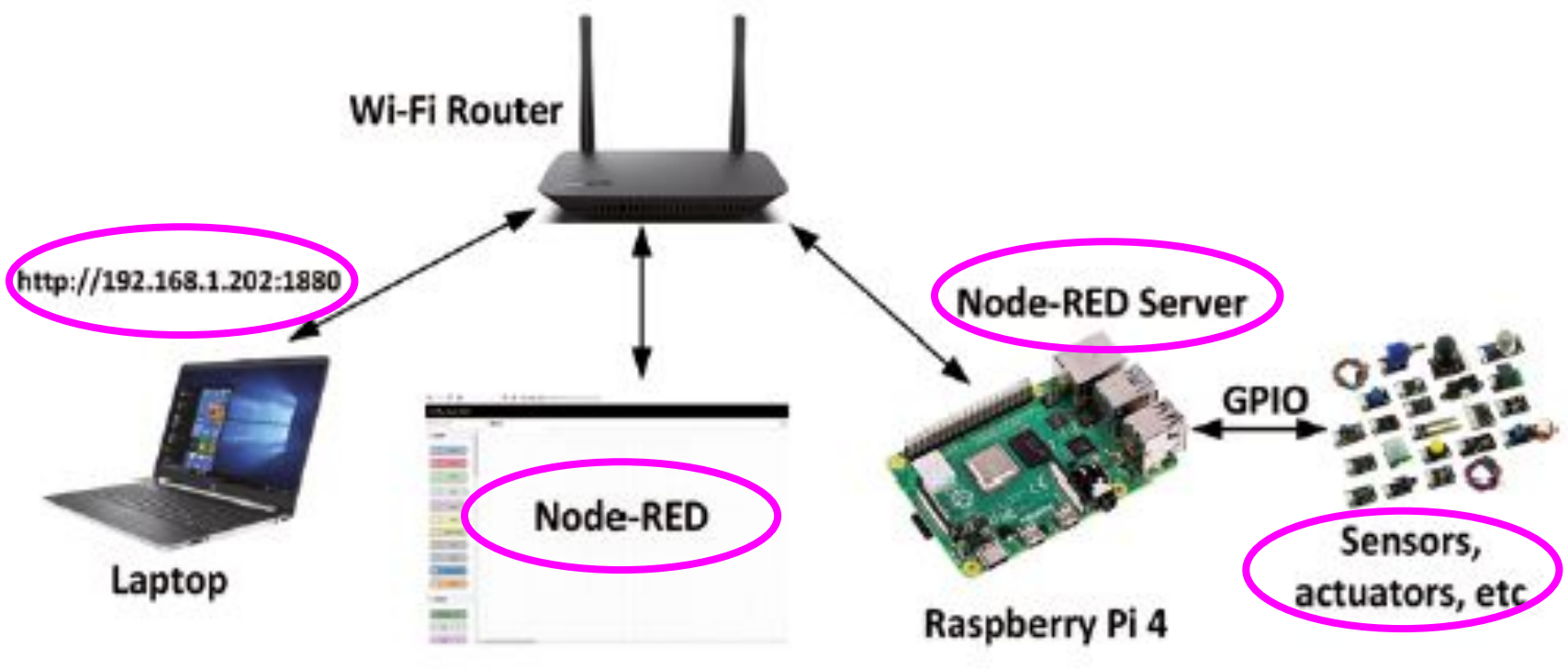
Rasp. PI



VNC Connect

architecture Node-Red

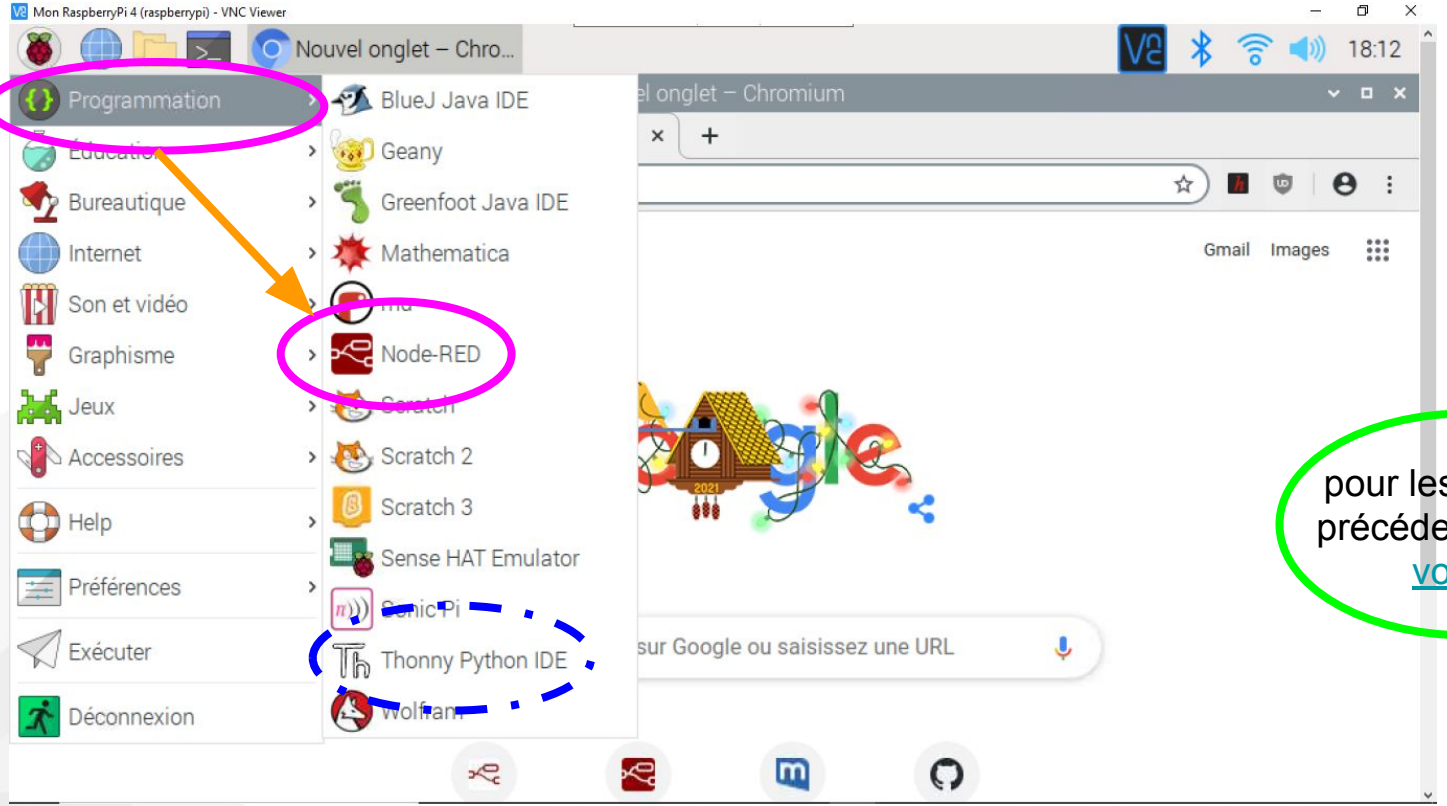
concept / fonctionnement



Lancement de Node-Red

sur le Pi 4

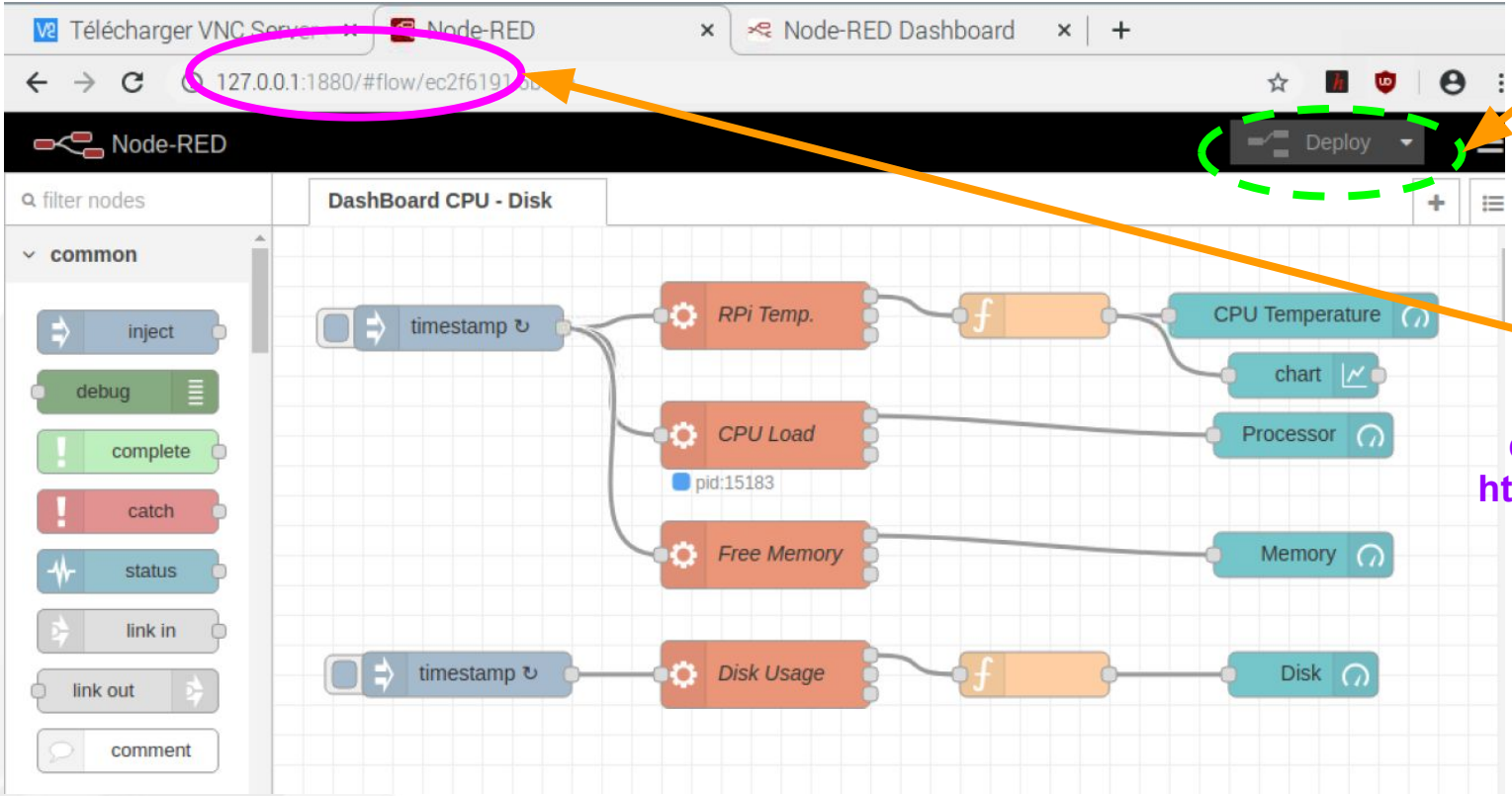
menu du Pi 4



pour les versions précédentes de pi [voir ici]

Node-Red flow

prog. graphique sur le Pi (puis deployed sur internet)

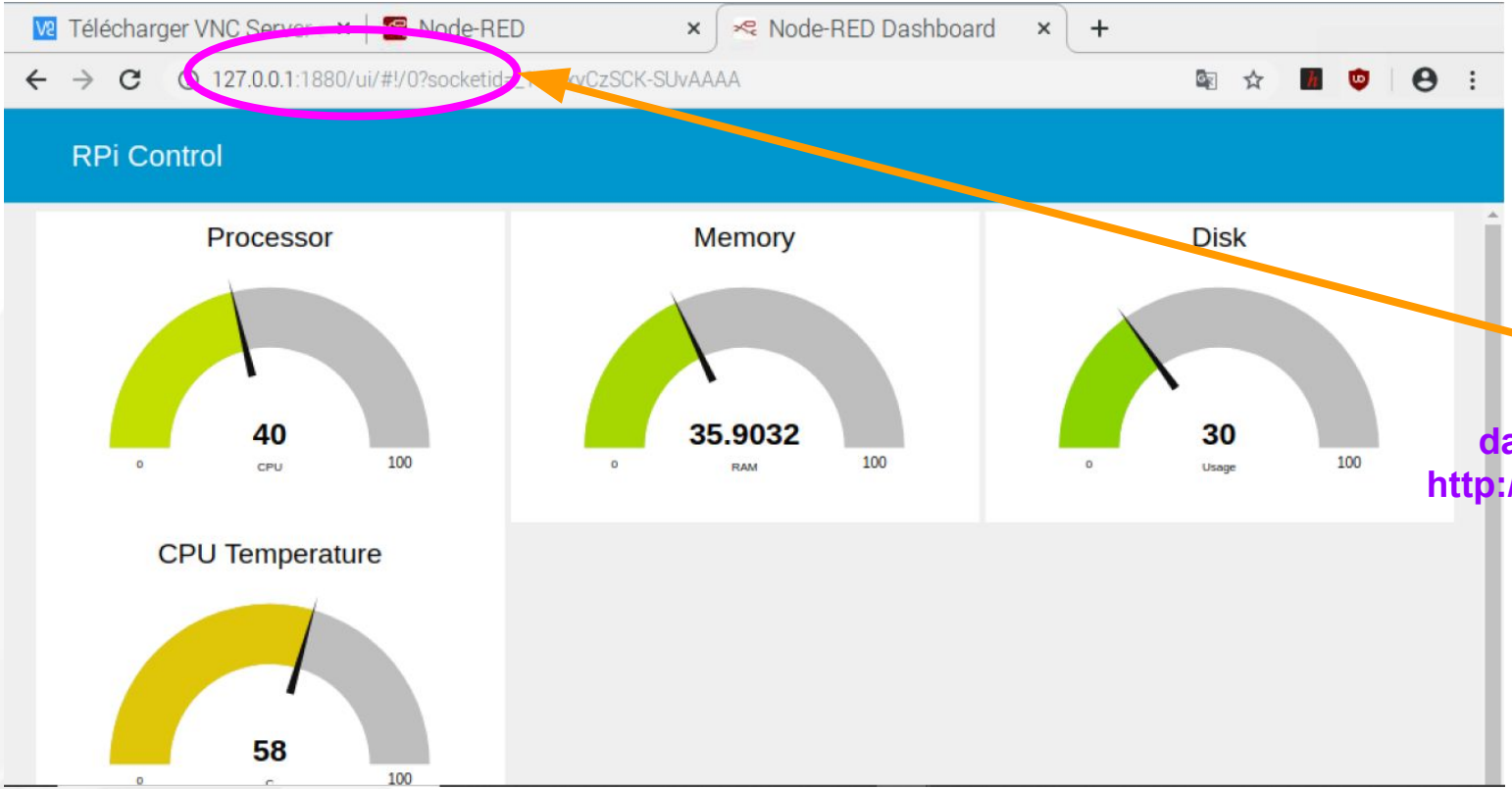


enregistrer le travail

affiche dans le bowser http://mon_ip:1880

Node-Red user interface

ex de résultat sur internet



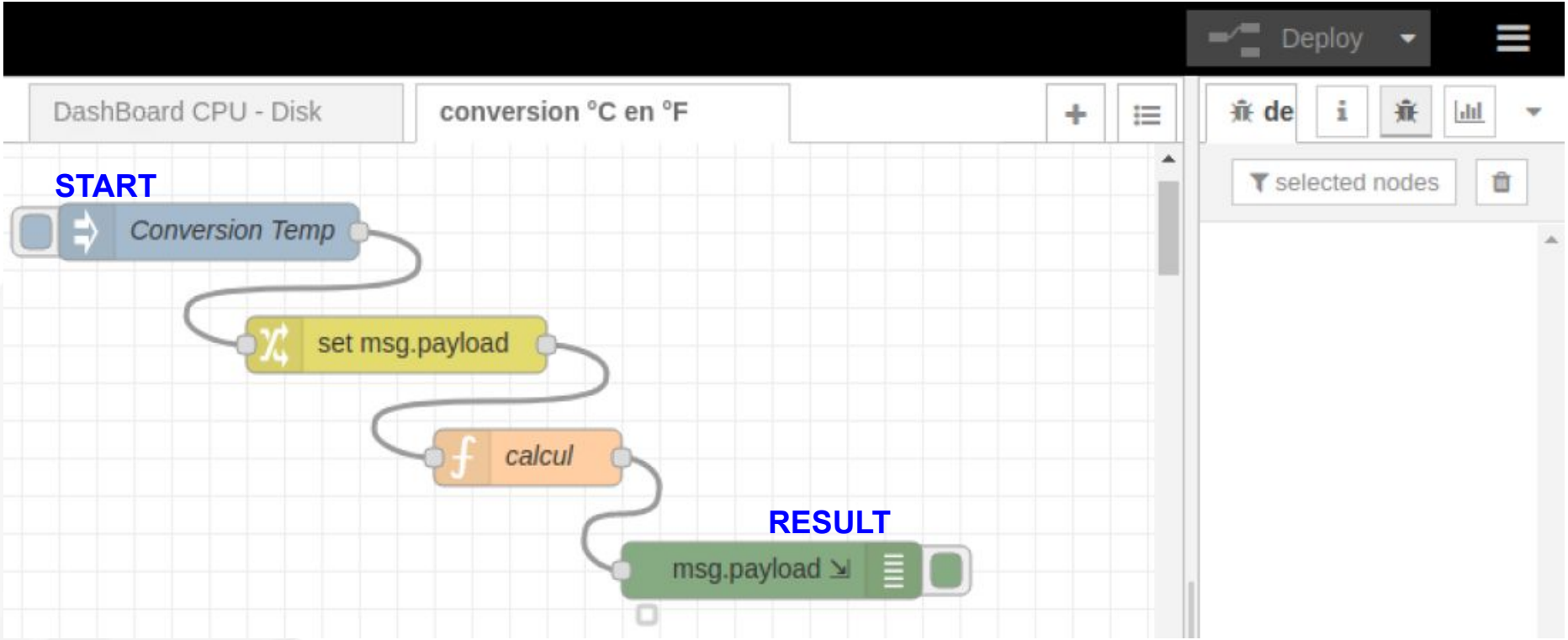
affiche
dans le bowser
http://mon_ip:1880/ui

Montage simple

- 1er flow : conversion température
- 2ème flow : get/send on internet
- importer un flow (puis le modifier)

1er flow

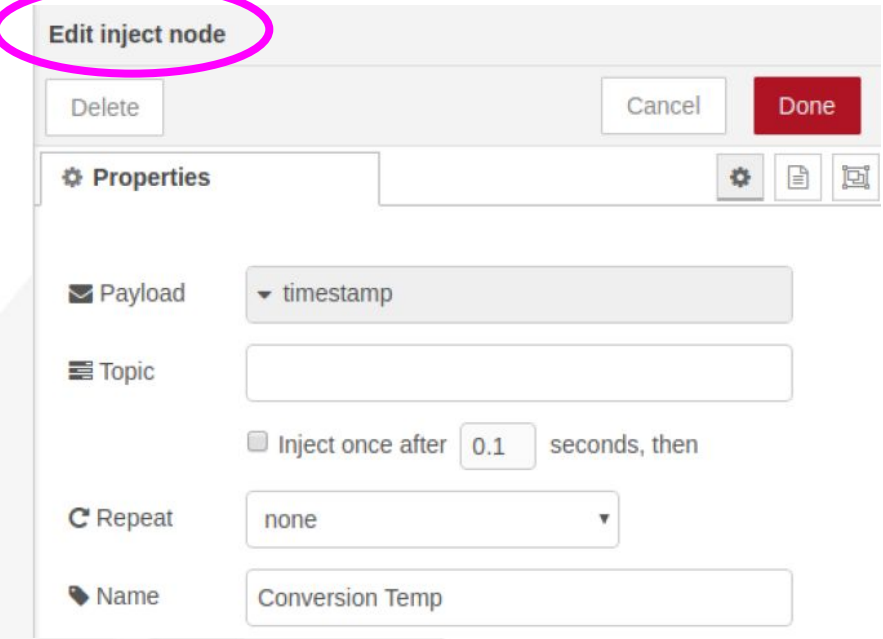
conversion température °C -> °F



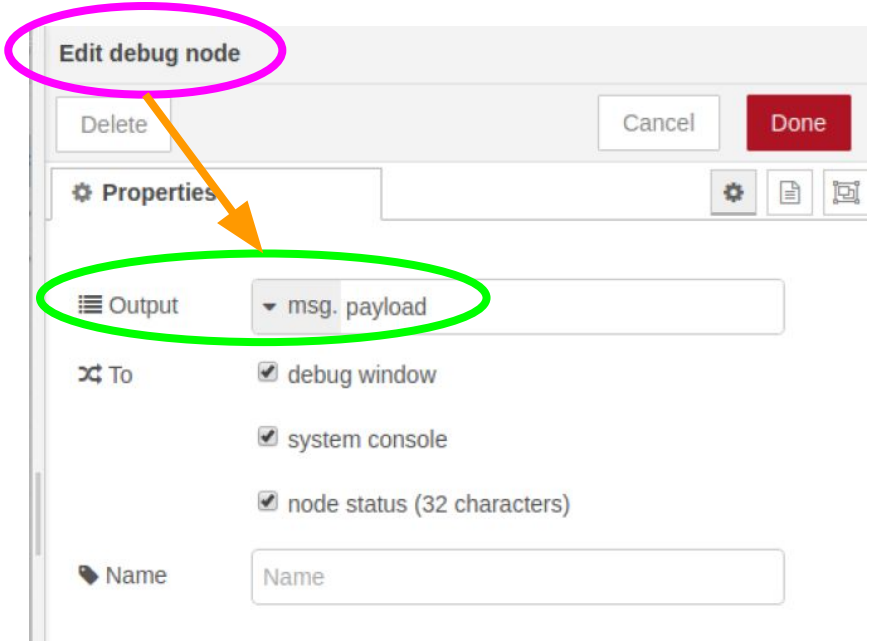
1er flow

conversion température °C -> °F

START

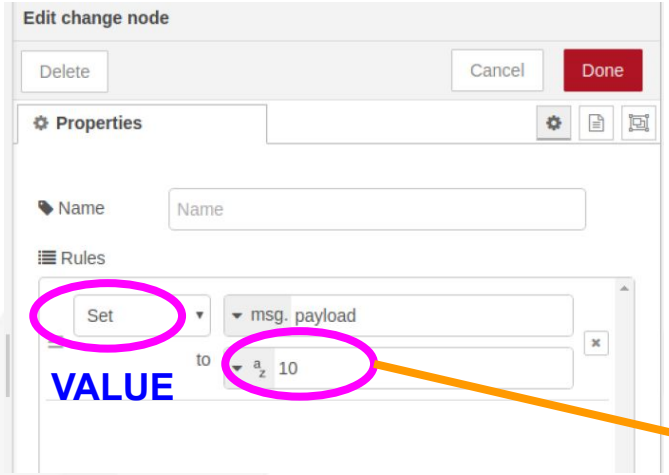


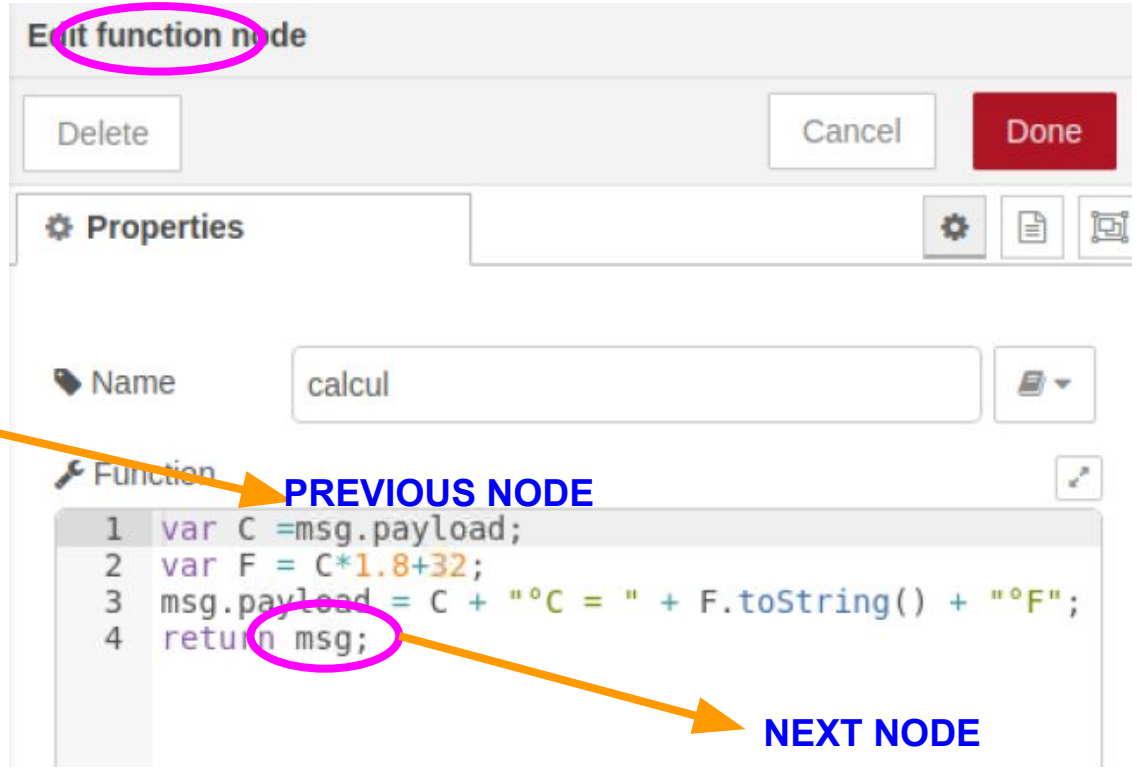
RESULT



1er flow

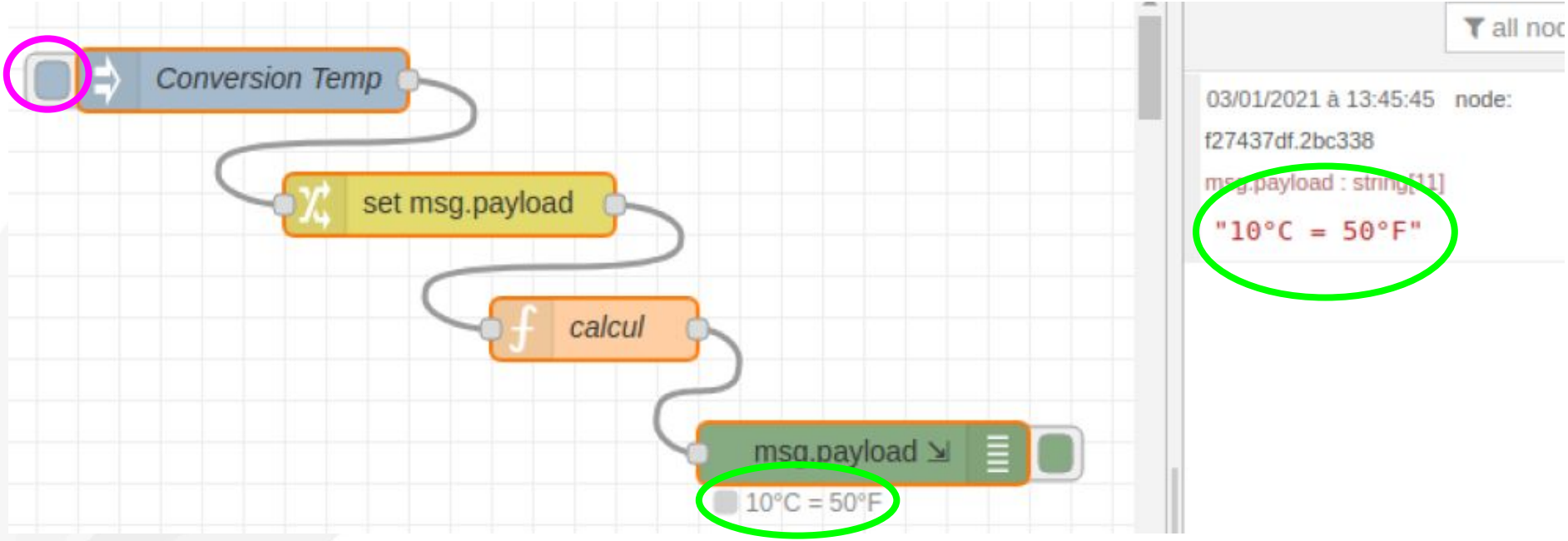
conversion température °C -> °F





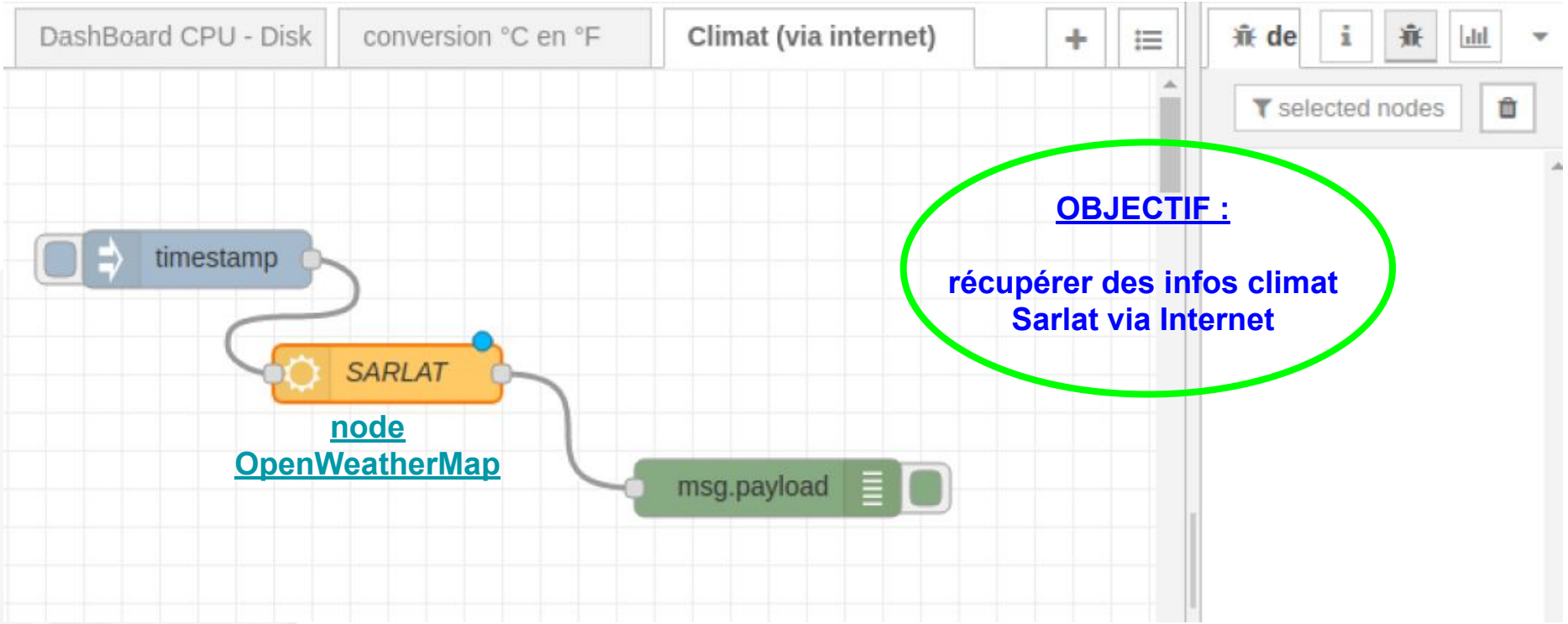
1er flow

conversion température °C -> °F



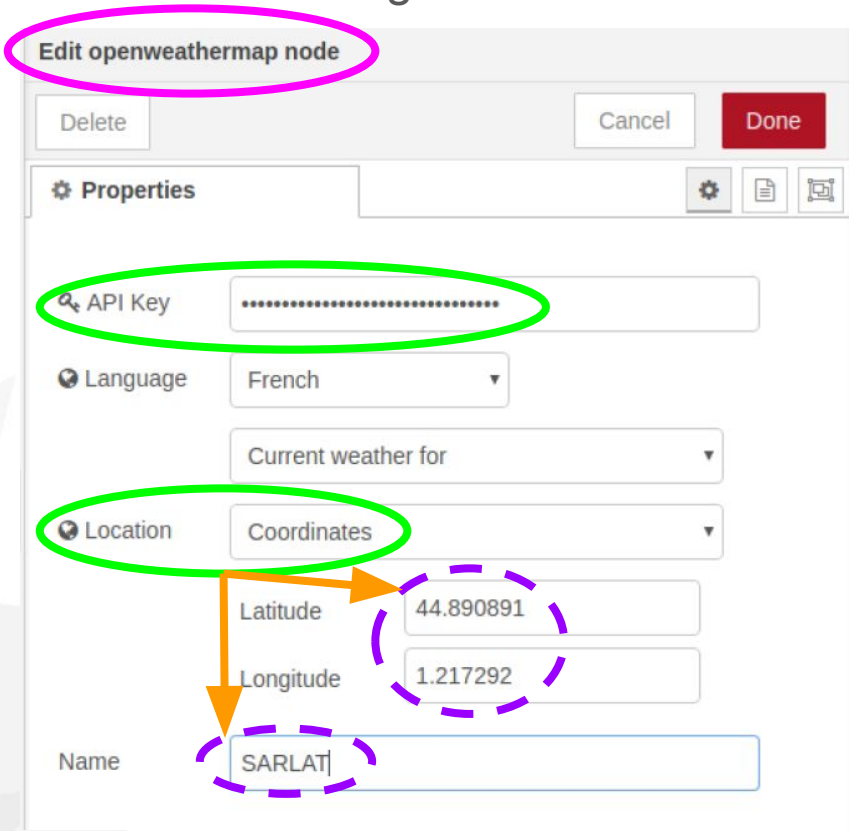
2ème flow

get/send info on internet



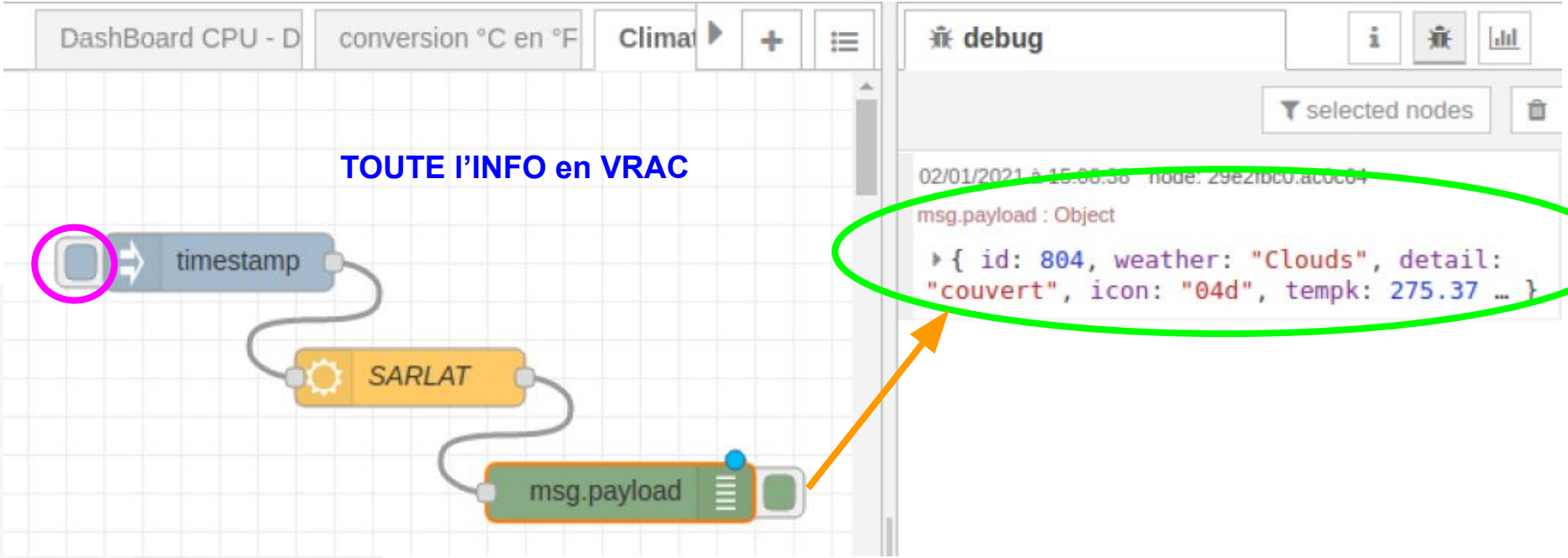
2ème flow

get/send info on internet



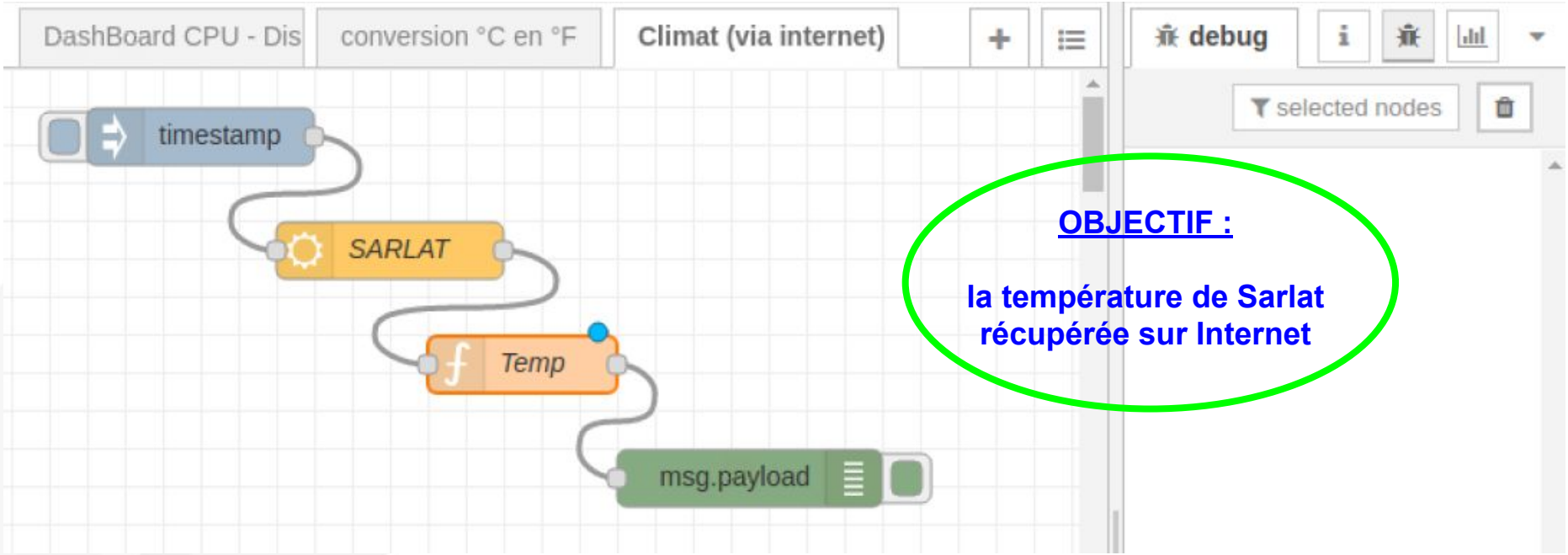
2ème flow

get/send info on internet



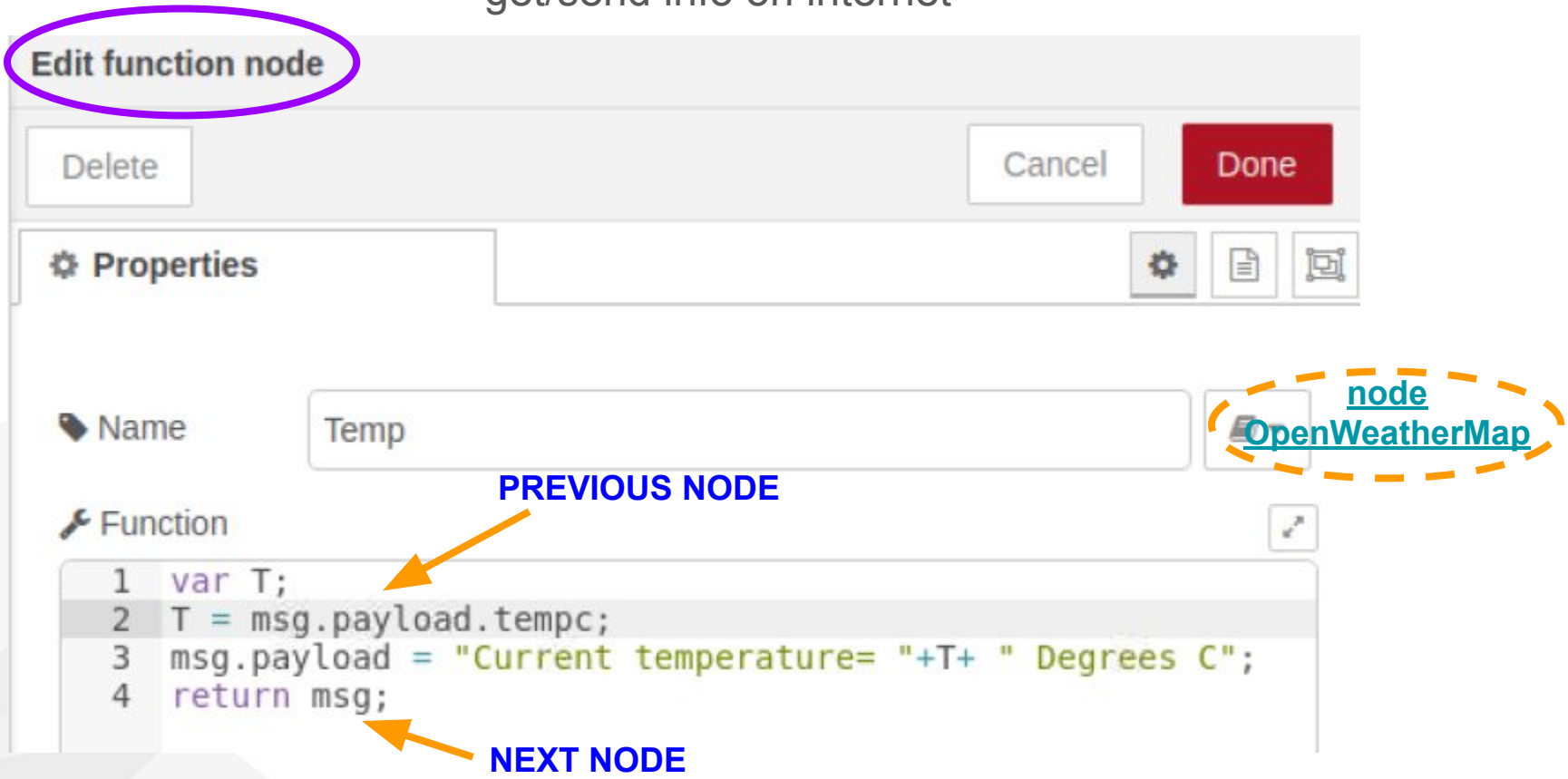
2ème flow

get/send info on internet



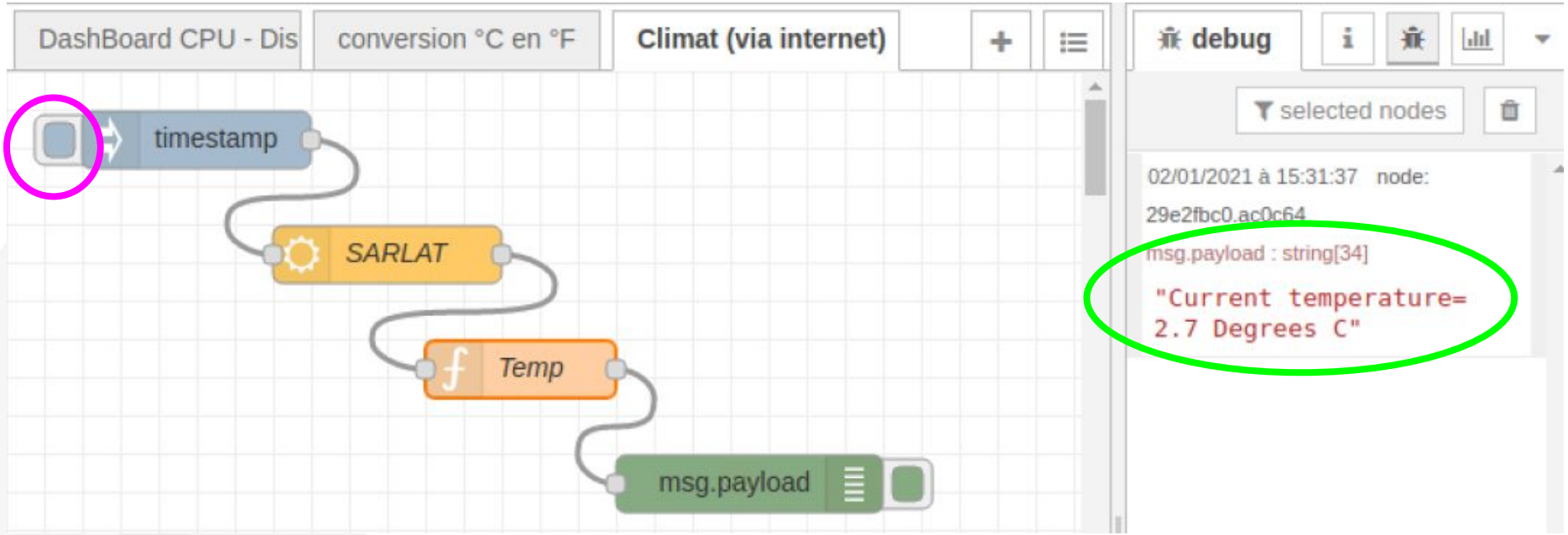
2ème flow

get/send info on internet



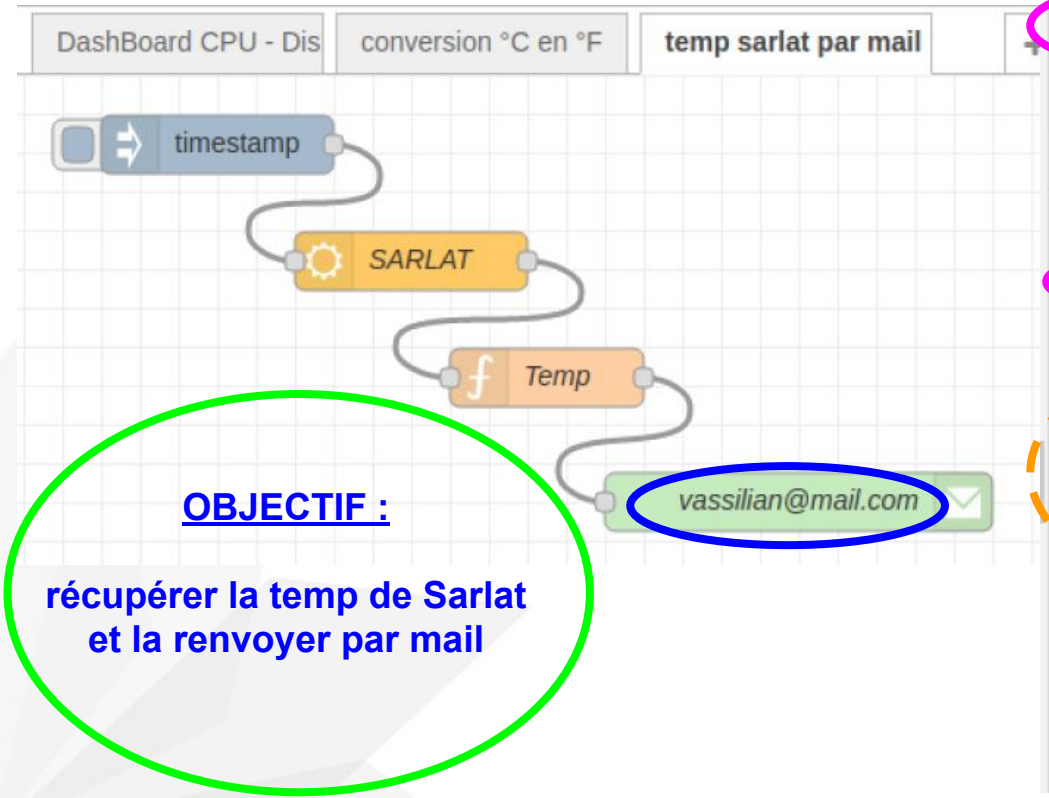
2ème flow

get/send info on internet



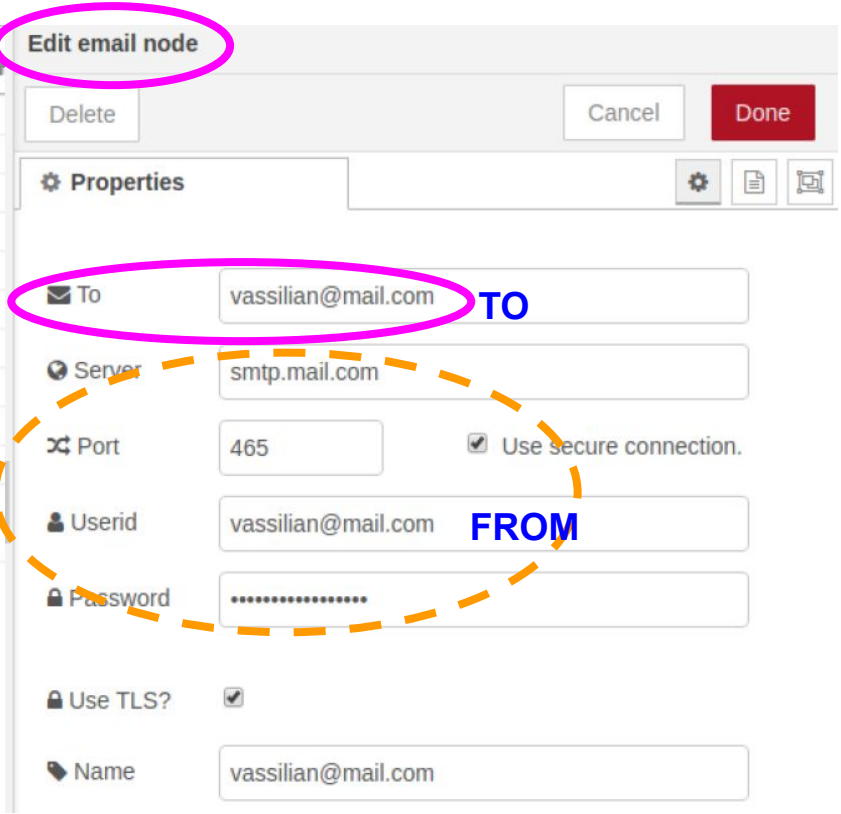
2ème flow

get/send info on internet



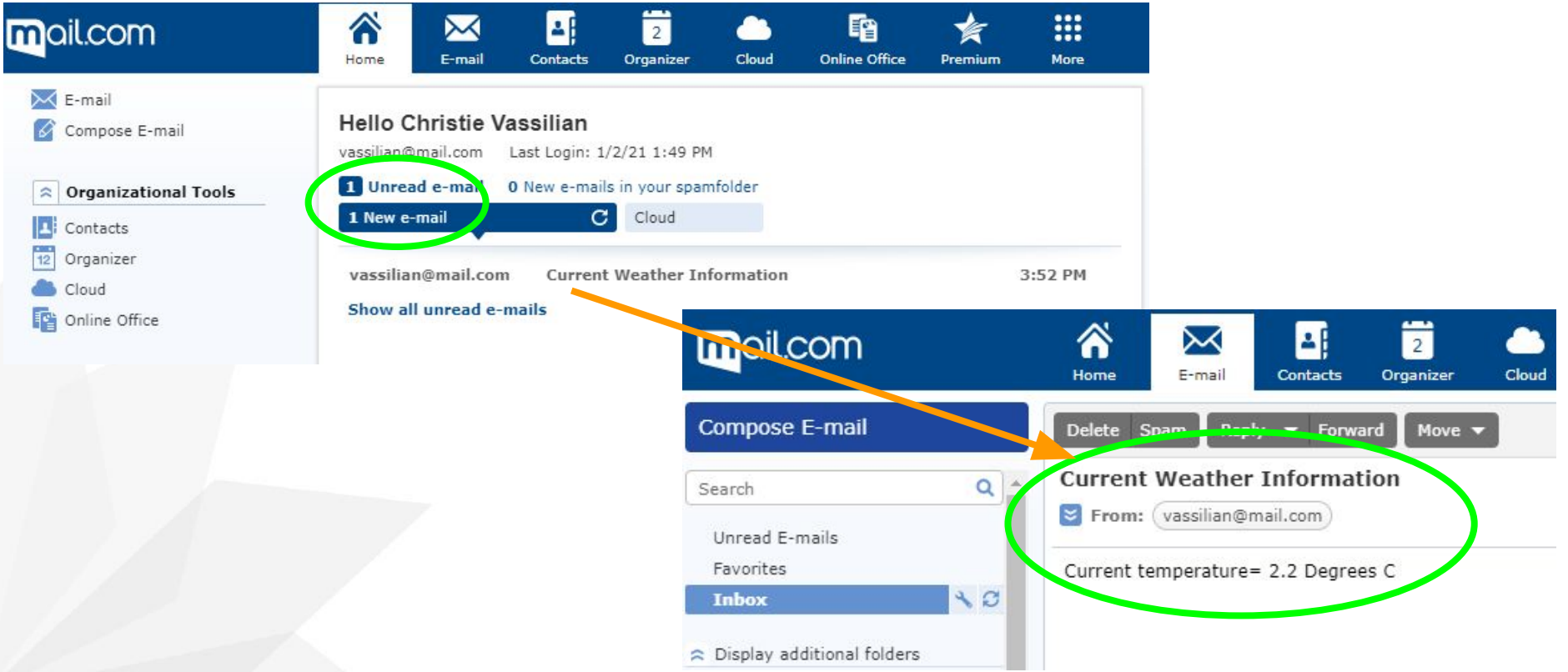
OBJECTIF :

récupérer la temp de Sarlat et la renvoyer par mail



2ème flow

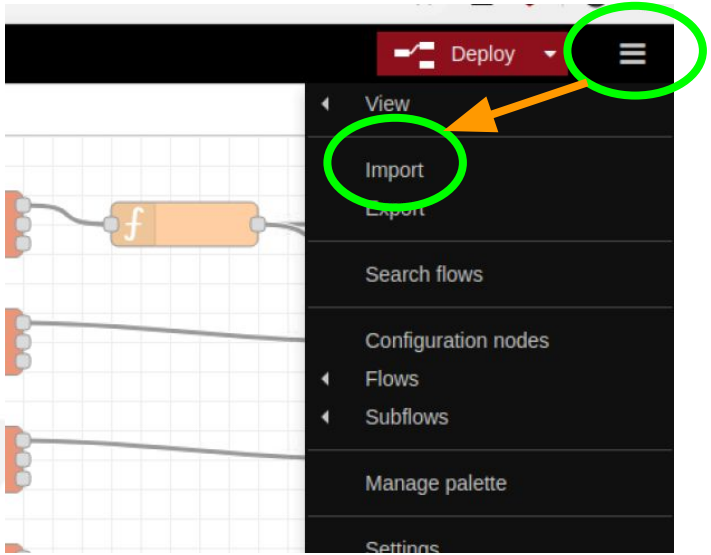
get/send info on internet



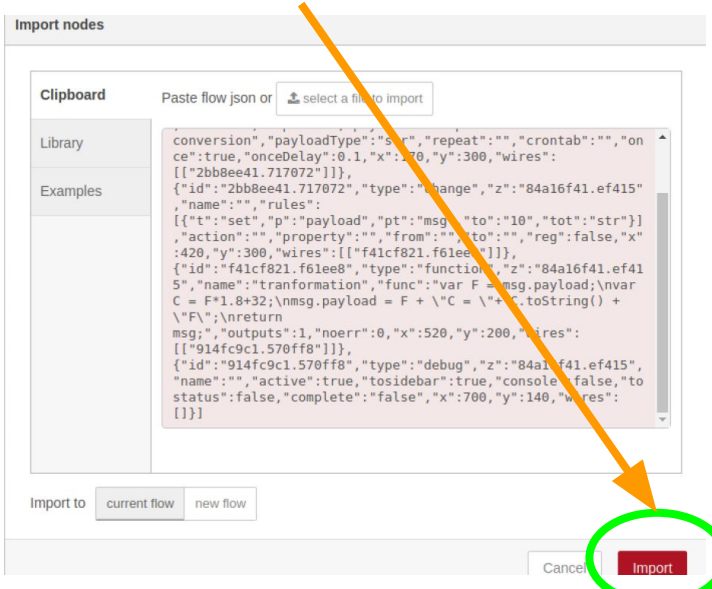
Importer un flow 1/2

trouver 1 flow sur le net
ctrl + C

choisir import

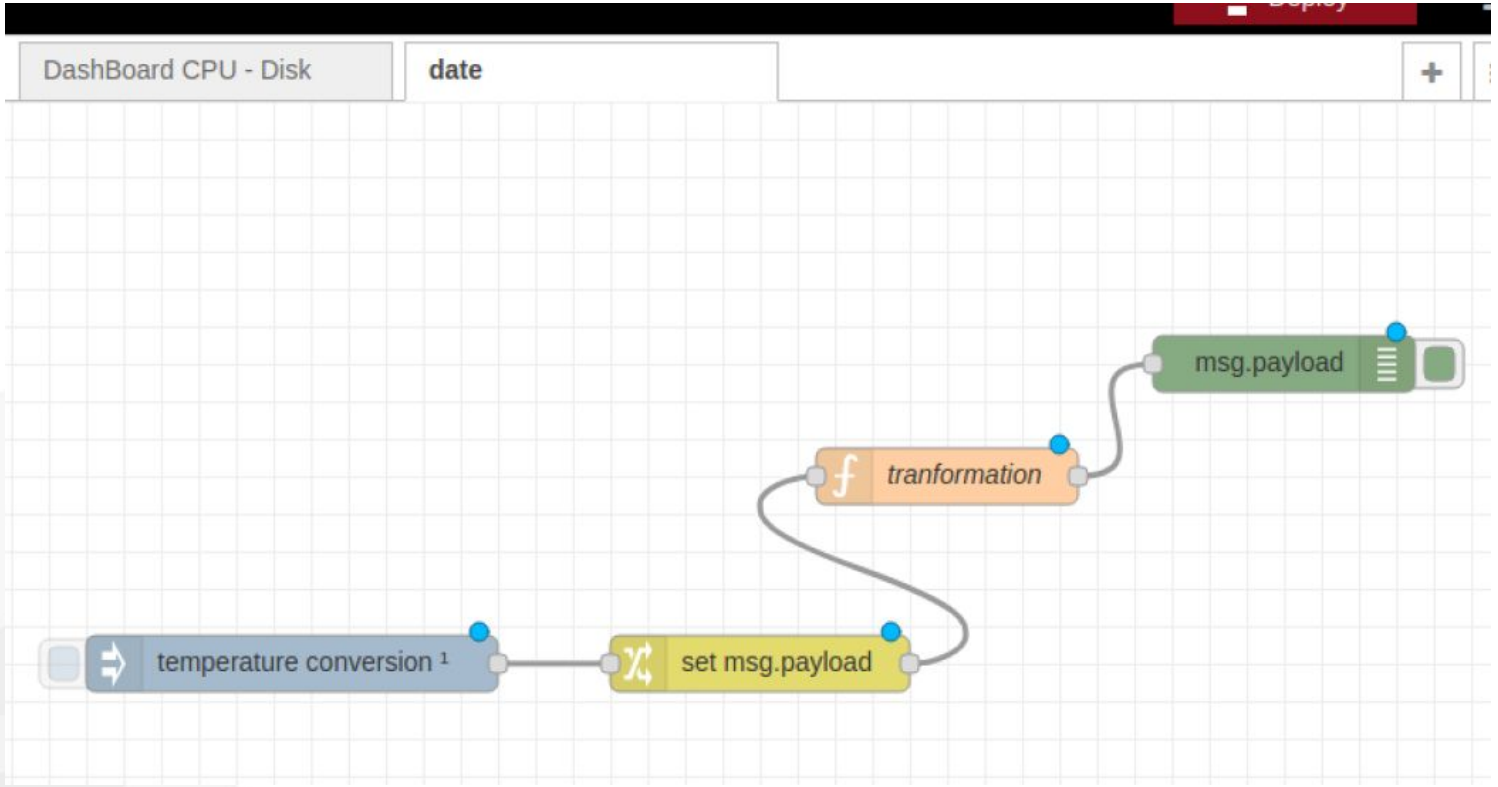


ctrl + V
appuyer sur import



Importer un flow 2/2

résultat de l'import



petit projet Node-Red

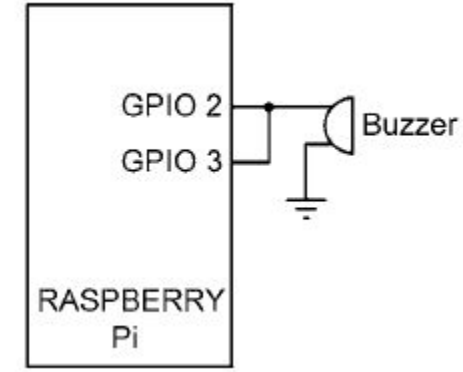
- alarme piloter à distance
- affichage sur écran I2 C LCD
- radar AV/AR voiture -> BUZZER
- dashboard sur internet

miniprojet : buzzer

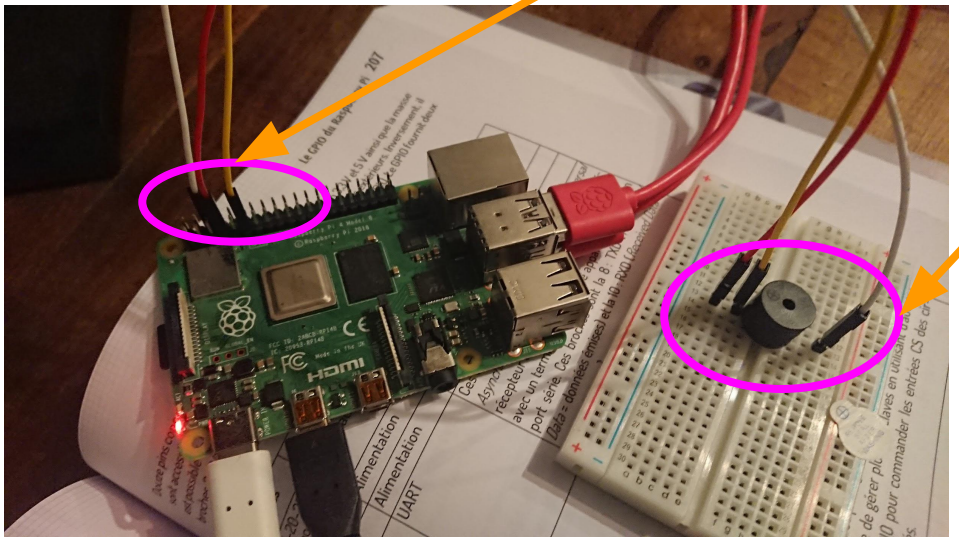
GPIO on Pi

OBJECTIF :

1. envoyer un mail d'alerte au Pi
2. le Pi déclenche un buzzer
3. renvoyer 1 mail de confirmation



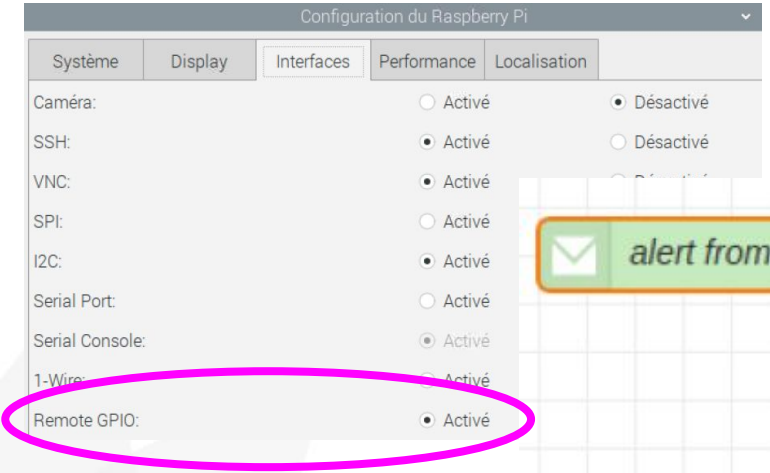
GPIO du Pi
port 4 et 17



BUZZER

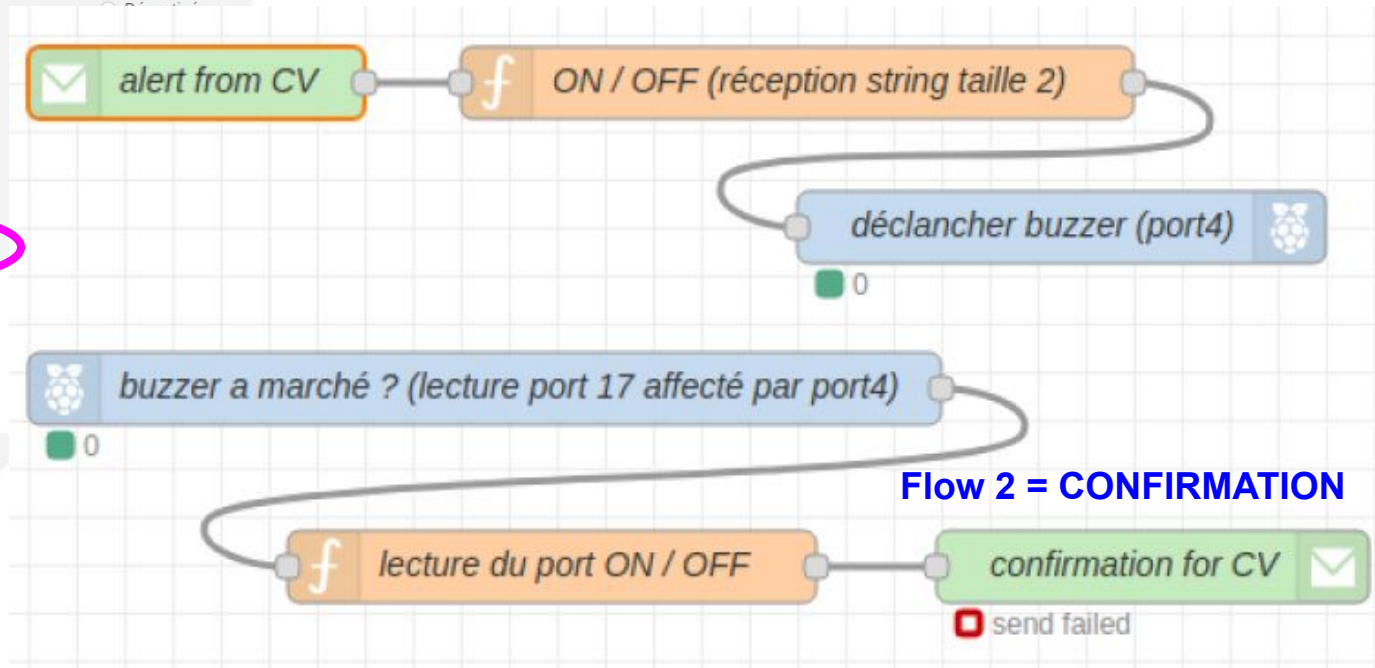
miniprojet : buzzer

GPIO on Pi



GPIO du Pi = ON

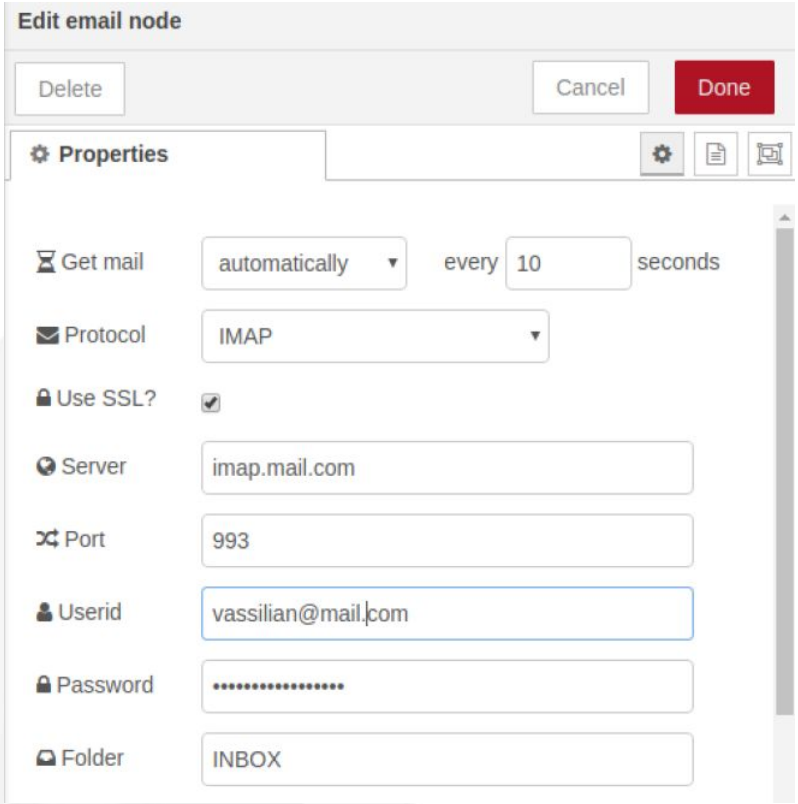
Flow 1 = ENVOI ALERTE

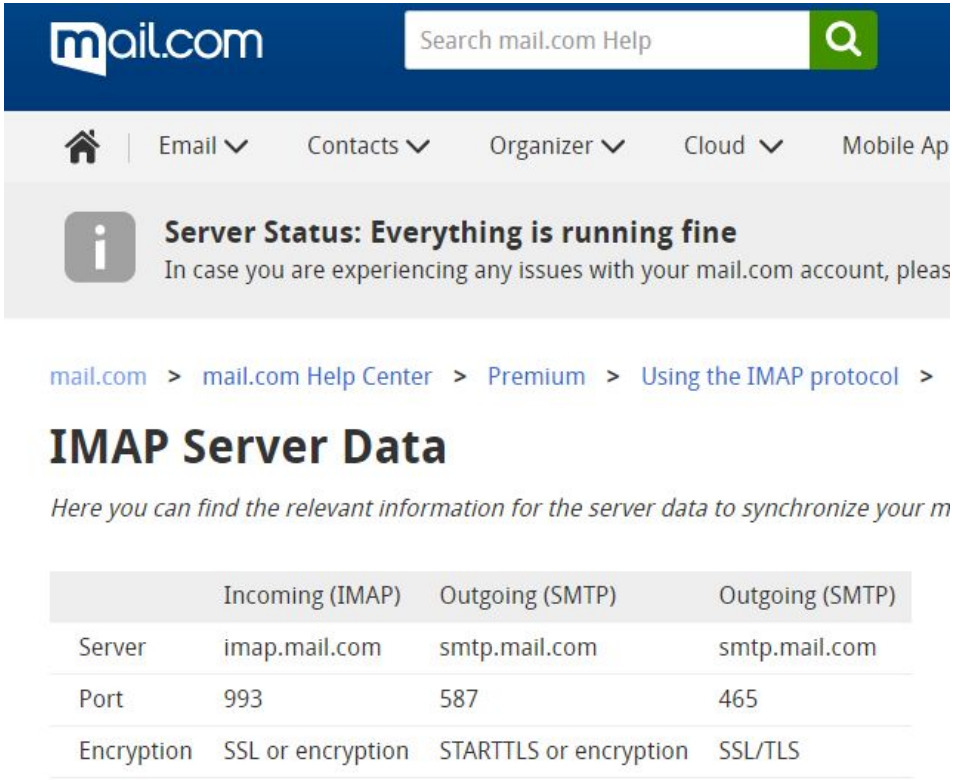


miniprojet : buzzer

GPIO on Pi

Node-RED





miniprojet : buzzer

GPIO on Pi

Edit function node

Delete | Cancel | Done

Properties

Name: ON / OFF (réception string taille 2)

Function

```
1  var cmd = msg.payload.substr(0,2);
2  var On = {payload: "1"};
3  var Off = {payload: "0"};
4
5  if(cmd == "ON")
6    return On;
7  else if(cmd == "OF")
8    return Off;
9
10 return msg;
```

Edit rpi-gpio out node

Delete | Cancel | Done

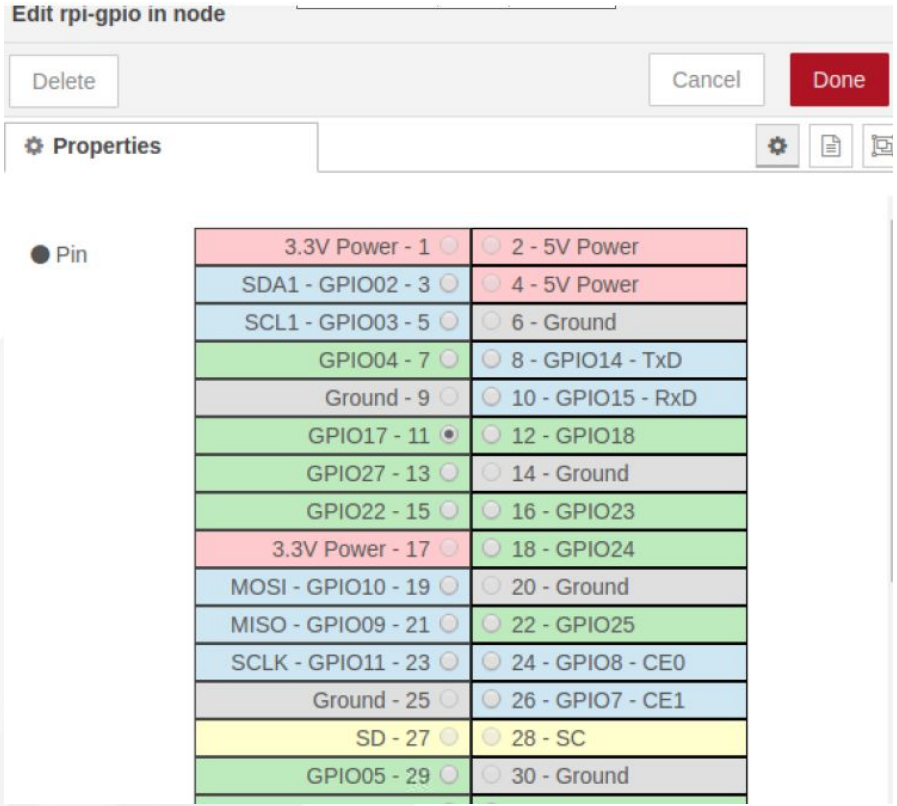
Properties

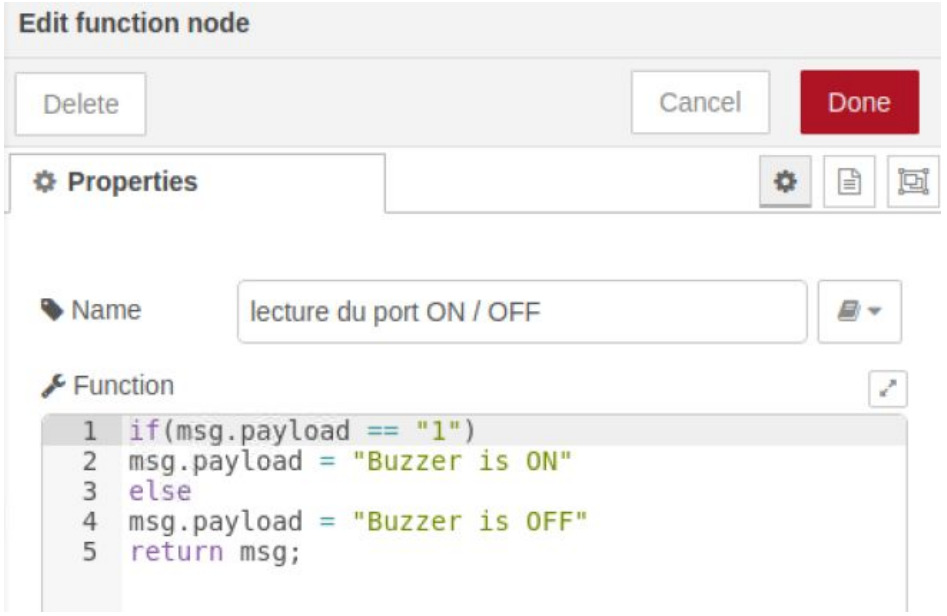
Pin

3.3V Power - 1	2 - 5V Power
SDA1 - GPIO02 - 3	4 - 5V Power
SCL1 - GPIO03 - 5	6 - Ground
GPIO04 - 7	8 - GPIO14 - TxD
Ground - 9	10 - GPIO15 - RxD
GPIO17 - 11	12 - GPIO18
GPIO27 - 13	14 - Ground
GPIO22 - 15	16 - GPIO23
3.3V Power - 17	18 - GPIO24
MOSI - GPIO10 - 19	20 - Ground
MISO - GPIO09 - 21	22 - GPIO25
SCLK - GPIO11 - 23	24 - GPIO8 - CE0
Ground - 25	26 - GPIO7 - CE1
SD - 27	28 - SC
GPIO05 - 29	30 - Ground
GPIO06 - 31	32 - GPIO12
GPIO13 - 33	34 - Ground

miniprojet : buzzer

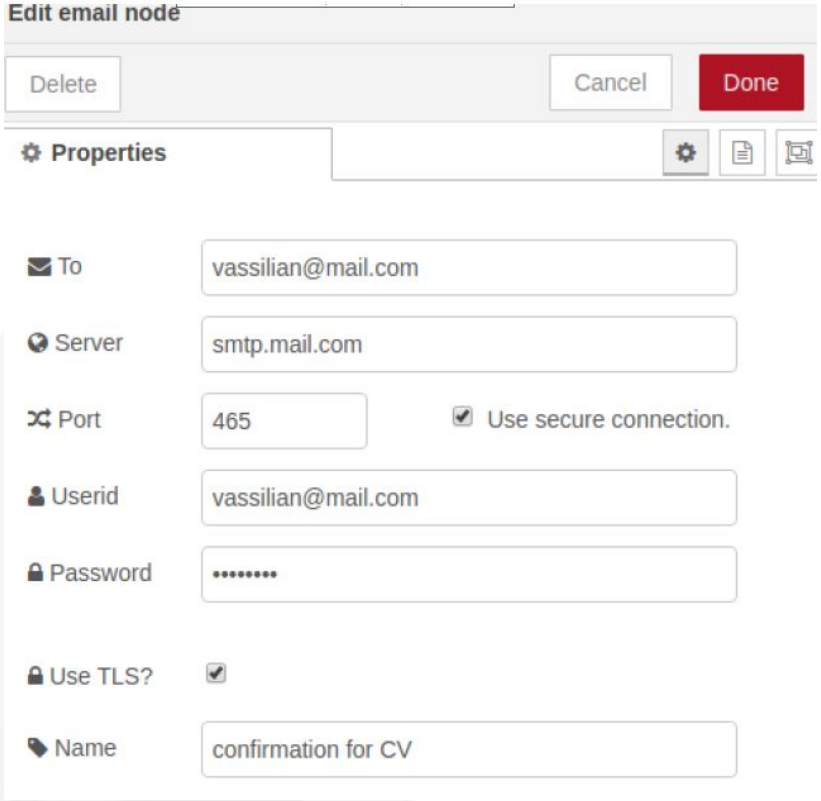
GPIO on Pi





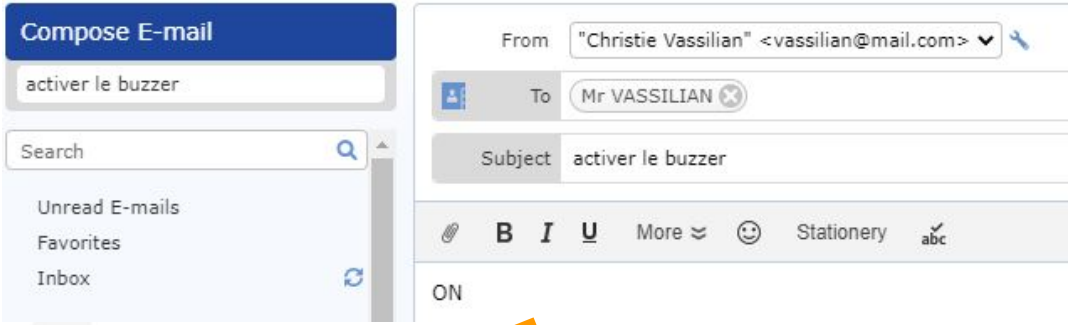
miniprojet : buzzer

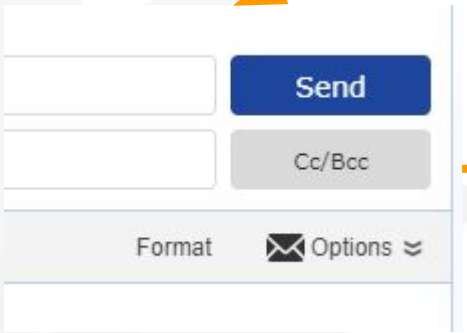
GPIO on Pi

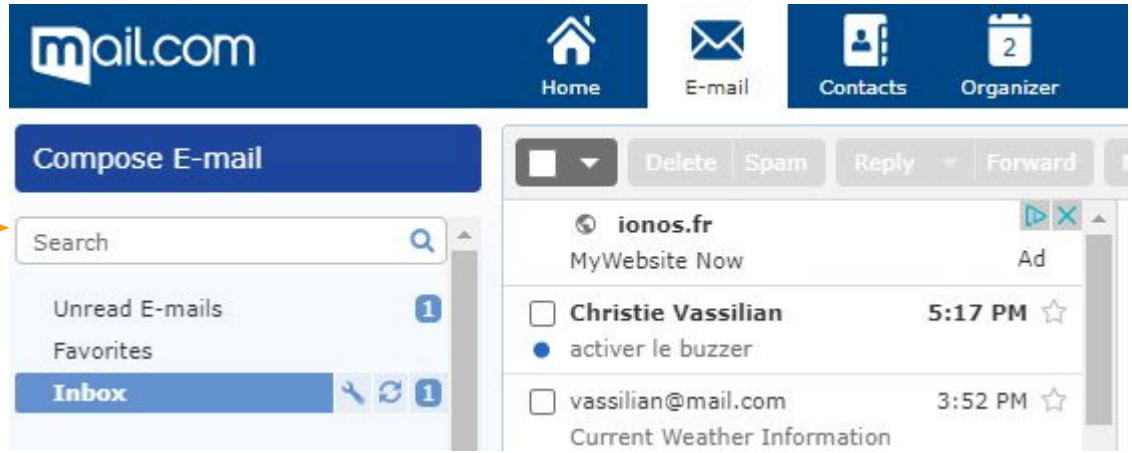


miniprojet : buzzer

GPIO on Pi

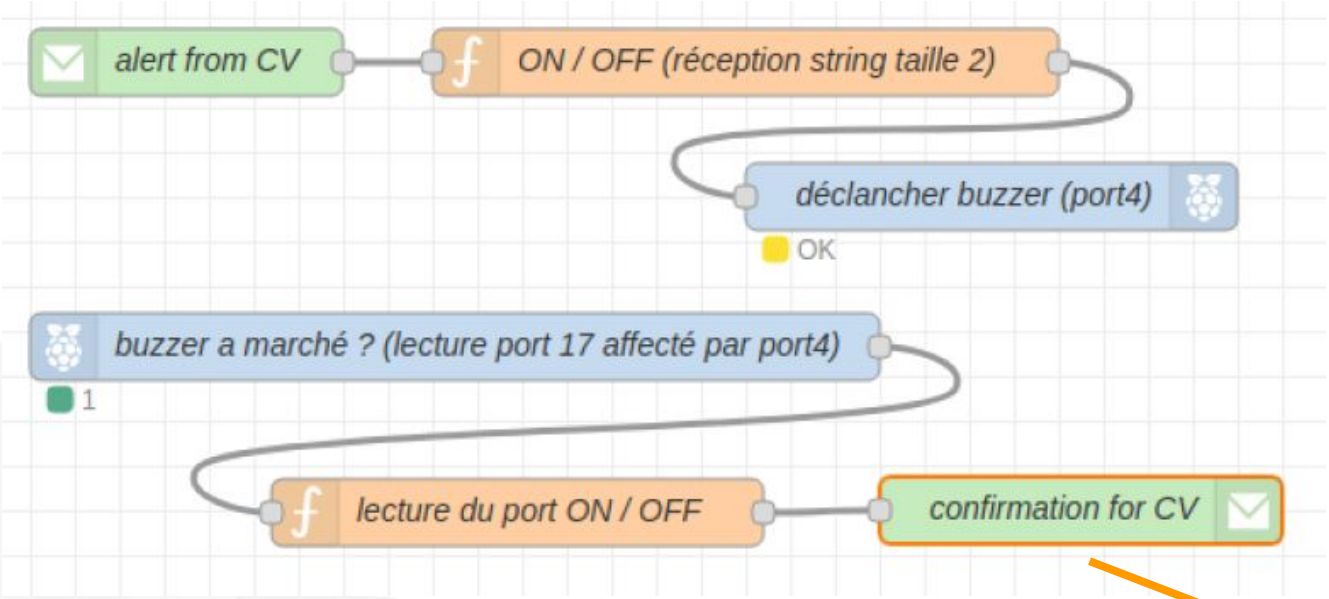


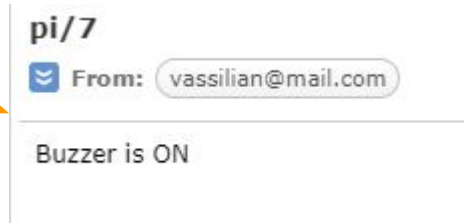




miniprojet : buzzer

GPIO on Pi



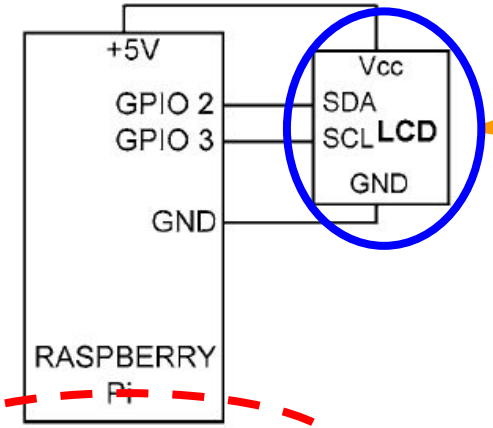


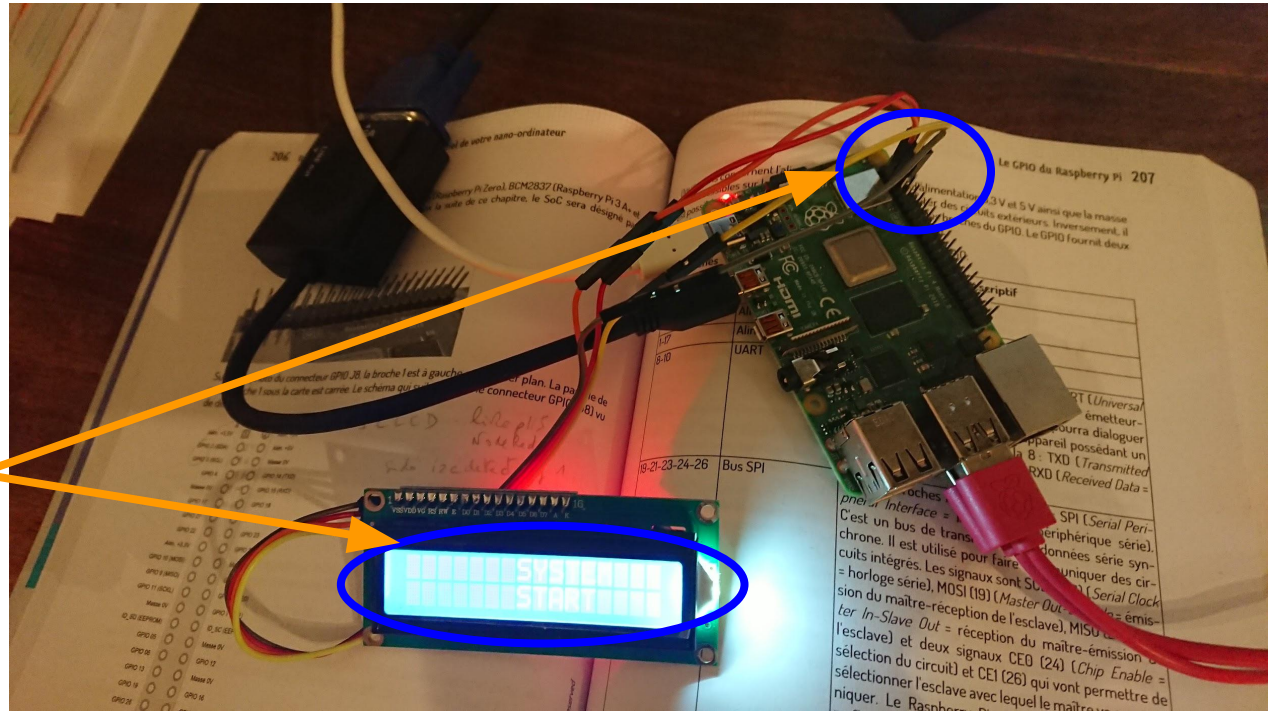
miniprojet : I2C LCD

GPIO on Pi

OBJECTIF :

1. **récupérer la temp à Sarlat sur internet**
2. **l'afficher sur écran LCD via la GPIO du Pi**

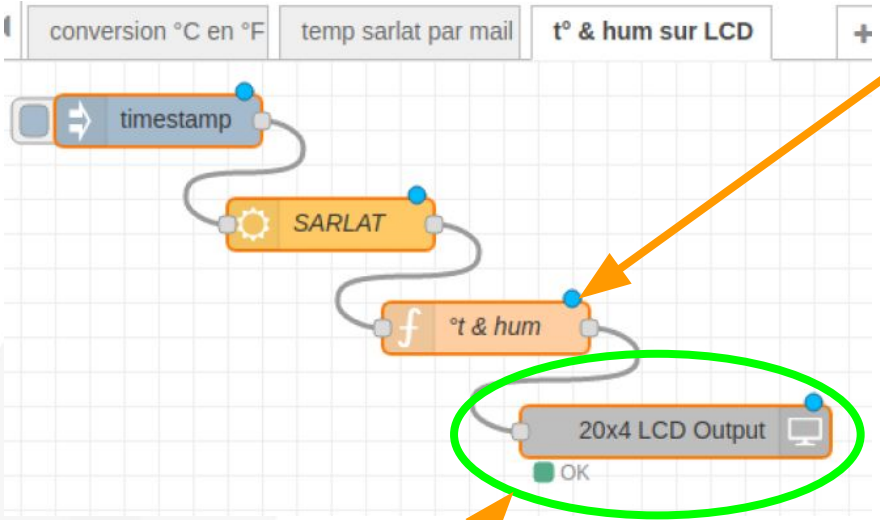




activer I2C sur le Pi

miniprojet : I2C LCD

GPIO on Pi



RIEN A FAIRE !!

Edit function node

Delete

Properties

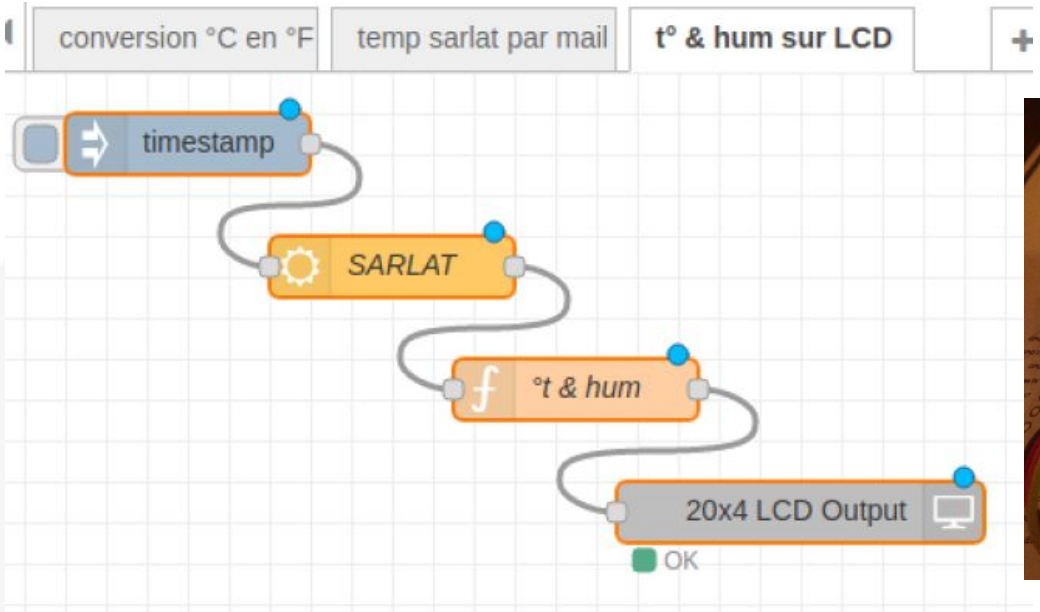
Name °t & hum

Function

```
1  var Temp = "T°C=" + msg.payload.tempc;
2  var Hum = "Hum=" + msg.payload.humidity;
3  msg.payload={msgs:[
4      {msg:"Current T & Hum"},
5      {msg:Temp + " " +Hum, pos:1}
6      ]};
7  return msg;
```

miniprojet : I2C LCD

GPIO on Pi

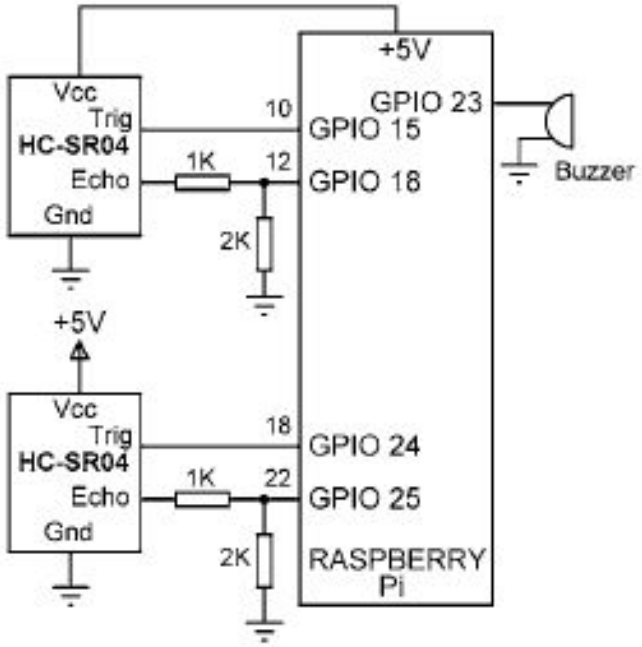


miniprojet : radar -> buzzer

GPIO on Pi

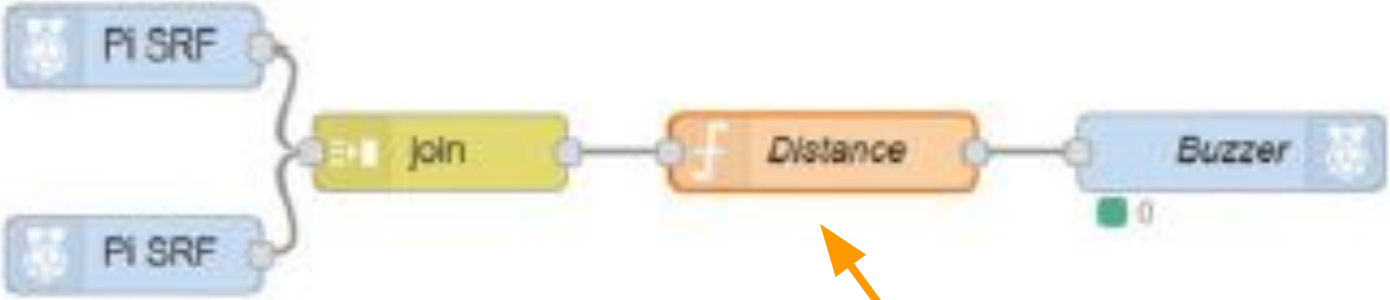
OBJECTIF :

1. véhicule se gare dans 1 parking
2. radar AV et radar AR de distance
3. buzzer se déclenche si trop prêt



miniprojet : radar -> buzzer

GPIO on Pi




```
var Distance1 = msg.payload[0];
var Distance2 = msg.payload[1];
if(Distance1 < 20 || Distance2 < 20)
   msg.payload = 1;
else
   msg.payload = 0;
return msg;
```

miniprojet : dashboard

affichage d'info en ligne

OBJECTIF :

1. **faire fonctionner le Pi sur 1 tâche (prog Python par ex)**
2. **mesurer des informations du Pi (°C, mémoire, …)**
3. **afficher l'info graphiquement en direct sur internet**

Problème du Rendu Monnaie :

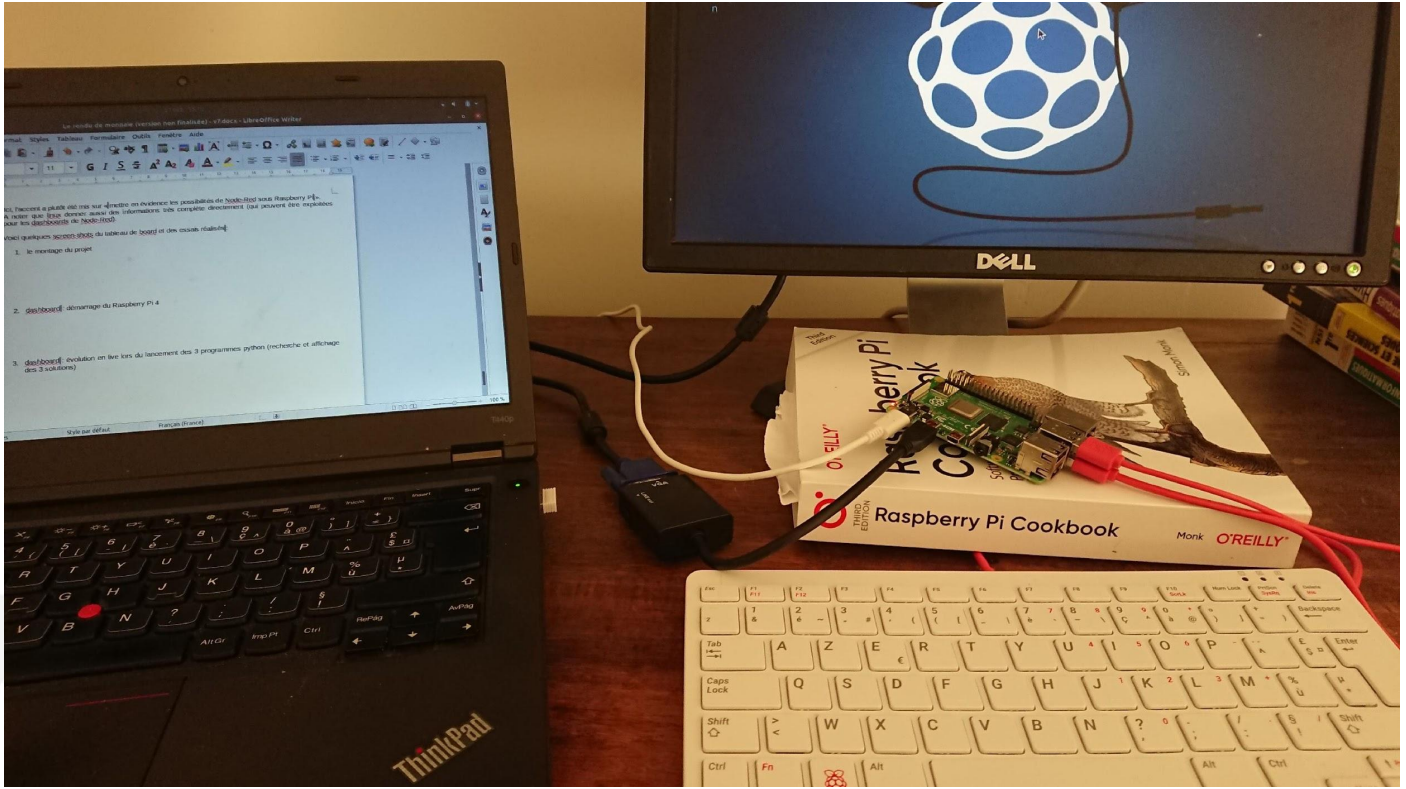
analyse empirique de la **complexité**

1. algo glouton - récursif - dynamique
2. faire tourner les prog python sur des jeux d'essais
3. mesurer et afficher les mesures

miniprojet : dashboard

affichage d'info en ligne

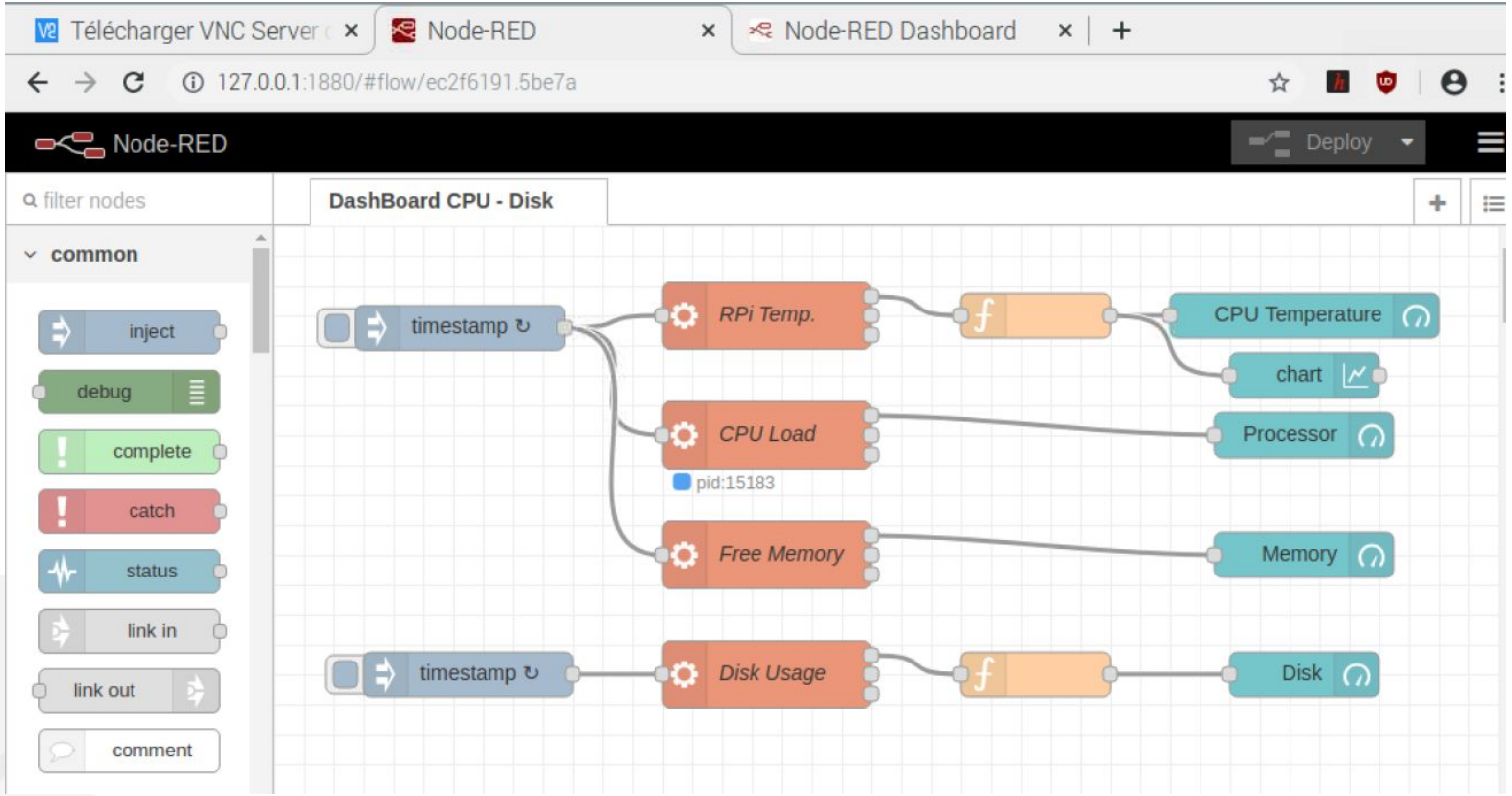
LE MONTAGE :



miniprojet : dashboard

affichage d'info en ligne

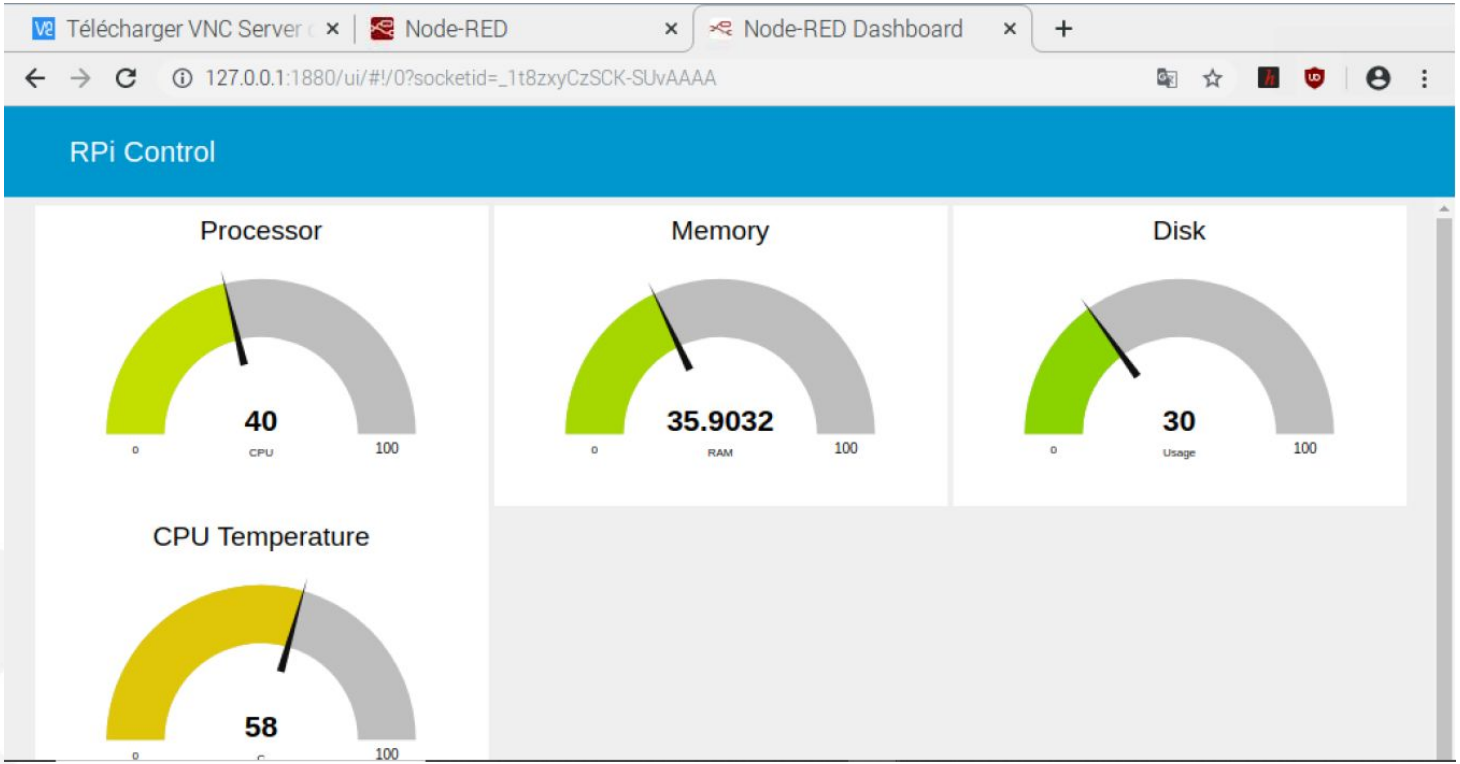
LE FLOW :



miniprojet : dashboard

affichage d'info en ligne

LE DASHBOARD :



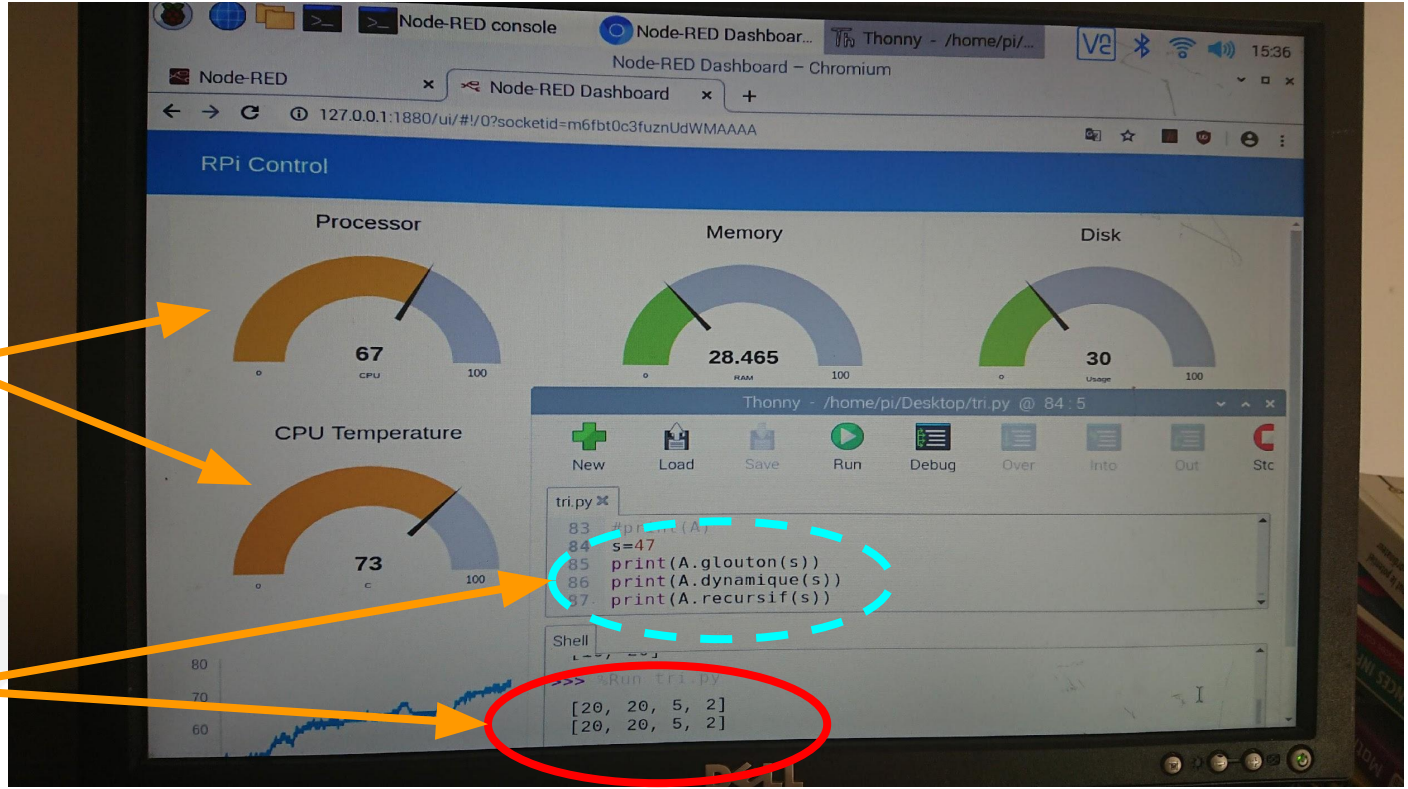
miniprojet : dashboard

affichage d'info en ligne

L'EXPERIENCE :

CA CHAUFFE !

ON ATTEND TOUJOURS LE RECURSIF !



ressource Node-Red

- site et forum
- vidéo en ligne
- livre, vidéo, formation (payant)
- mon site petitfuté.com

ressource Node-Red

la communauté du node

Site et Forum :

1. node-red
2. node-red prog
3. inscrivez-vous sur le forum de node-red
4. ma page perso : petitfuté.com/nodered

Pour bien démarrer :

un petit projet bien ficelé
2 flows faciles

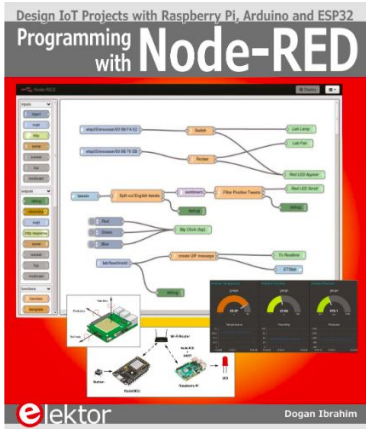
Livres pour poursuivre :

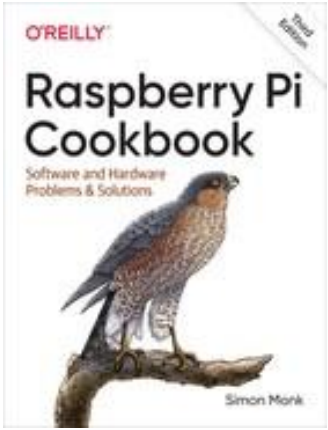
1. programming with node-red
2. rapberry pi cookbook

Ne pas oublier les vidéos (youtube …) et les formations (udemy …)

Vidéo et Formation :

1. node-red channel sur youtube
2. pleins d'autres chaînes (souvent plus simples) sur youtube
3. quelques formations pas cher sur udemy





Thank you

take care !

Node-RED