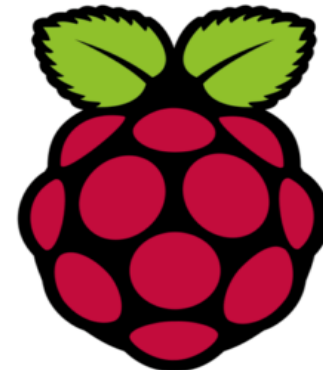
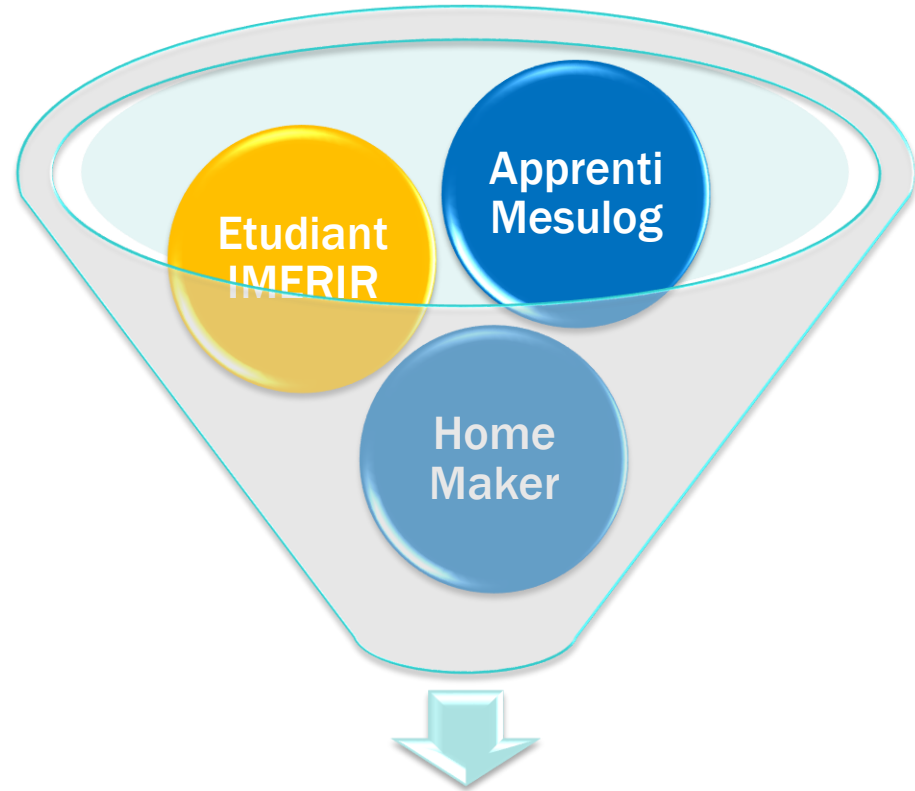


LabVIEW, Arduino et Raspberry





INSTITUT MÉDITERRANÉEN
D'ÉTUDES ET DE RECHERCHE EN
INFORMATIQUE ET ROBOTIQUE



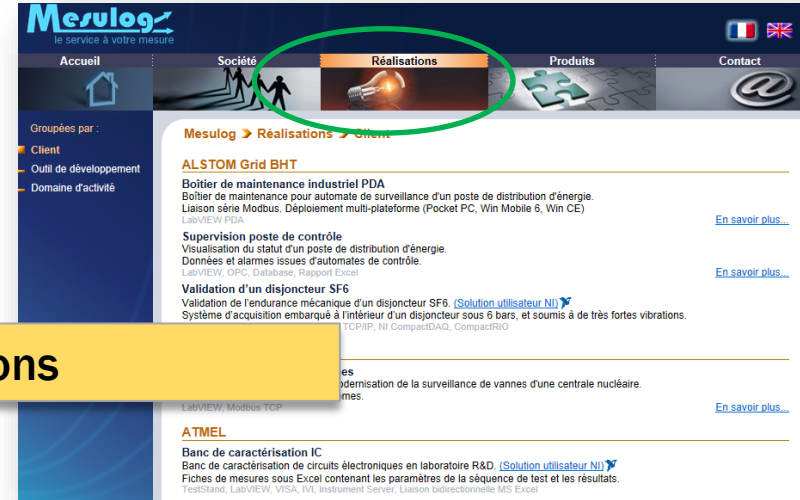
Benjamin LERCH

- ❑ Activité : Développement logiciel test et mesure
- ❑ Compétences : **LabVIEW** (Windows, RT, DSC, FPGA),
TestStand
VeriStand
- ❑ Localisation : Moirans (Grenoble, 38)
- ❑ Partenaire National Instruments (2001)
- ❑ Développeurs certifiés LabVIEW et TestStand



□ www.mesulog.fr

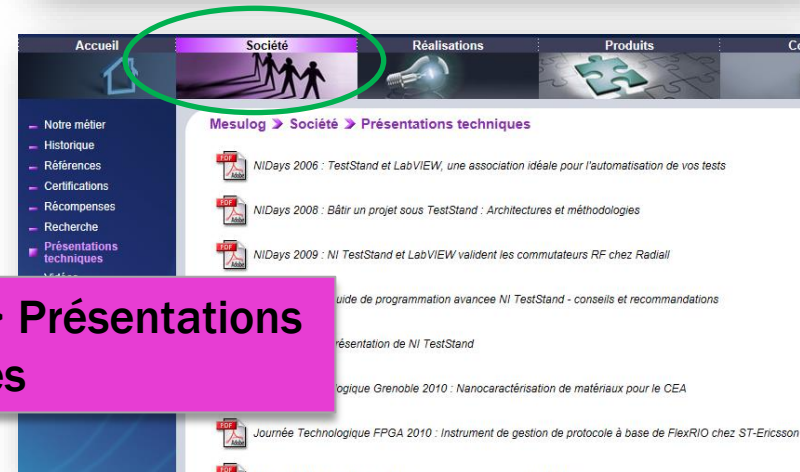
- Réalisations (article utilisateur)



Réalisations

- Présentations techniques

- LabVIEW
- TestStand
- VeriStand



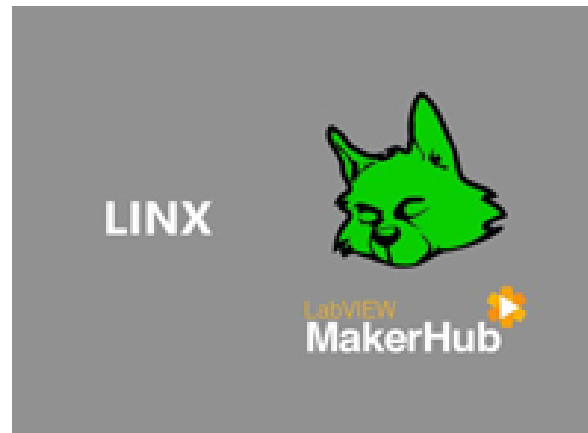
Société -> Présentations techniques



- I. Introduction au Toolkit LINX
- II. Arduino avec LINX
- III. Raspberry PI avec LINX
 - Embarquer une application sur Raspberry
 - Interface Web

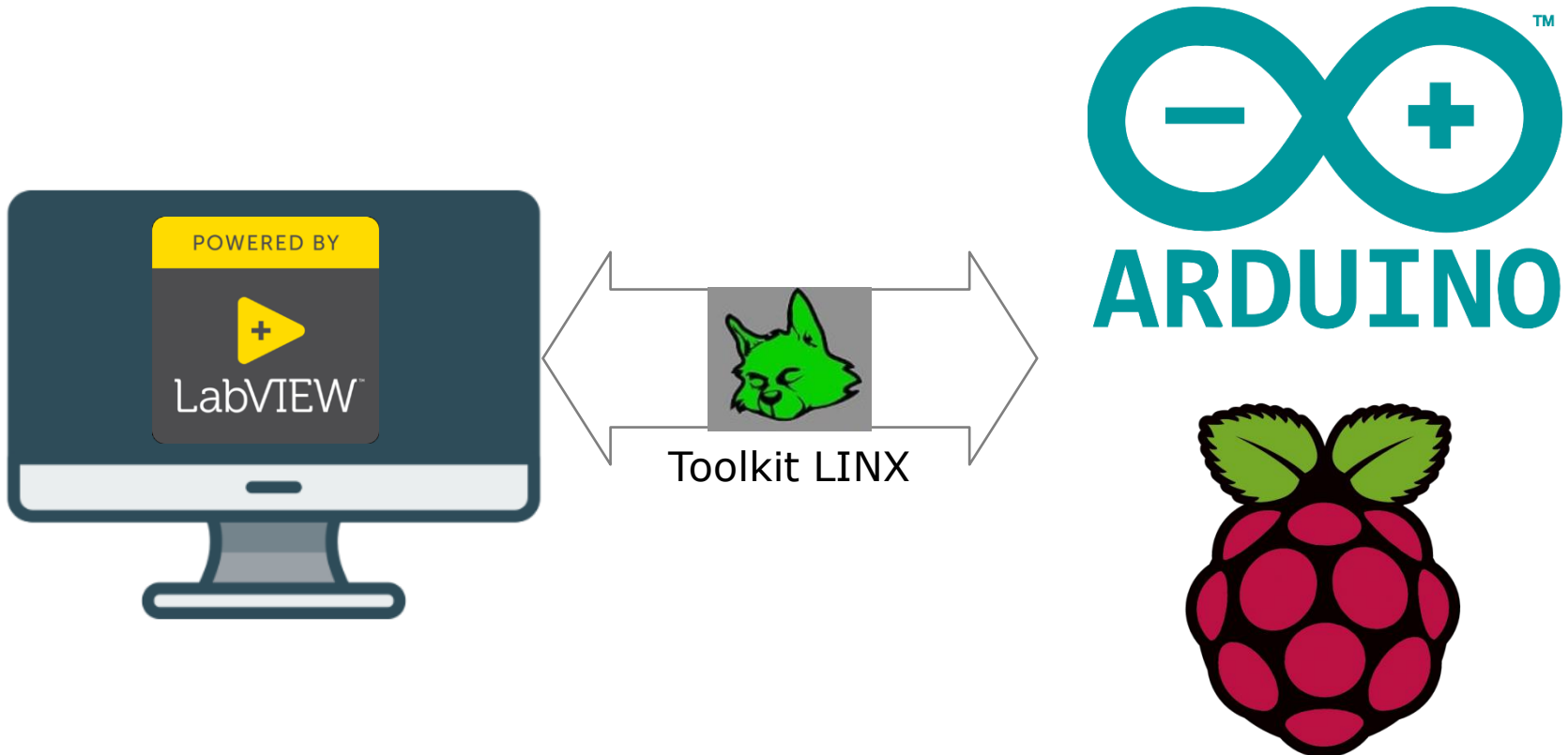
- Community Edition

 **LabVIEW™** Community Edition

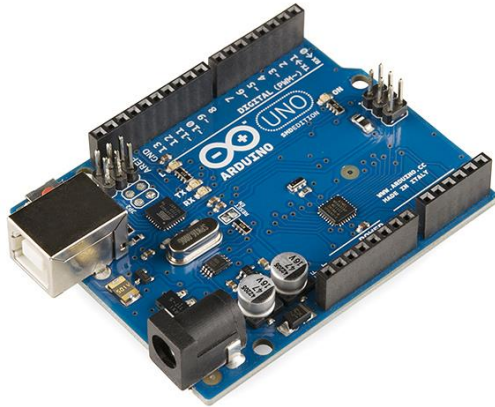


 **LabVIEW™ NXG** Community Edition

- Principe de fonctionnement



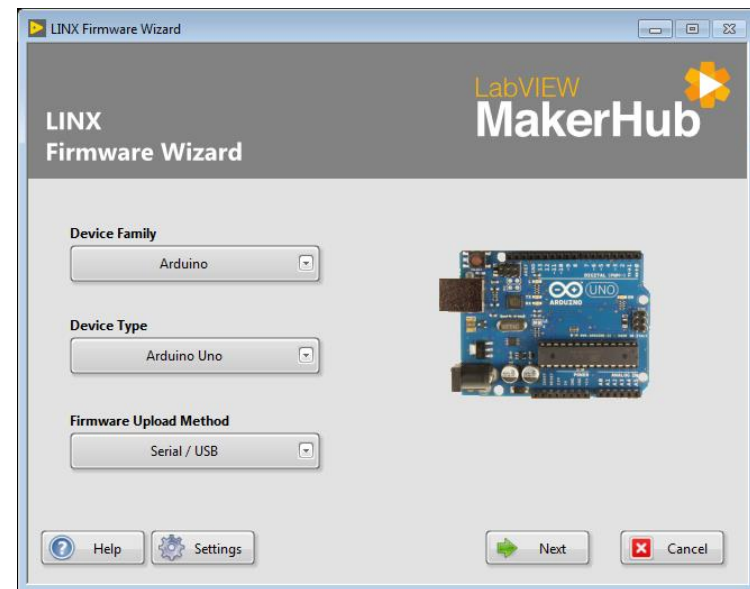
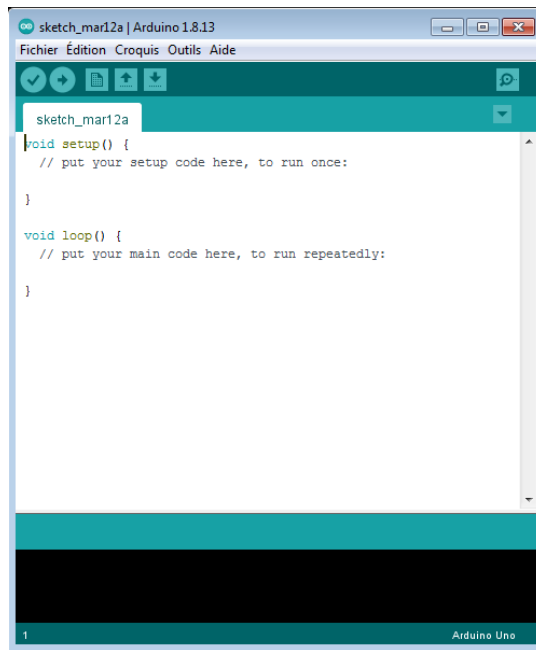
❑ Qu'est-ce qu'un Arduino ?



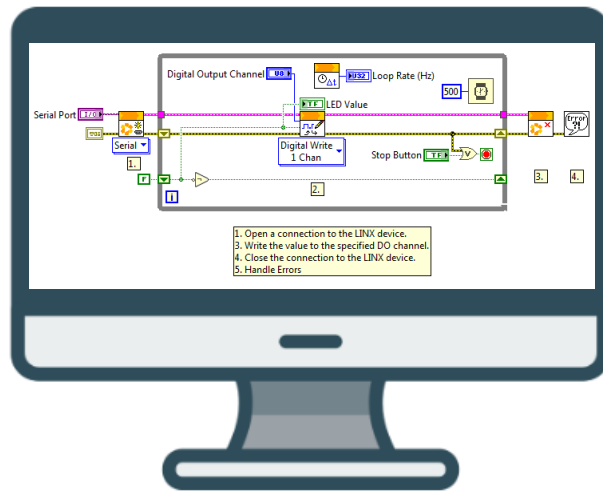
- Microcontrôleur Atmega
- Entrées/Sorties numérique et analogique 0-5V
- Communication Série, I2C et SPI



□ Programmation Arduino



❑ Principe fonctionnement



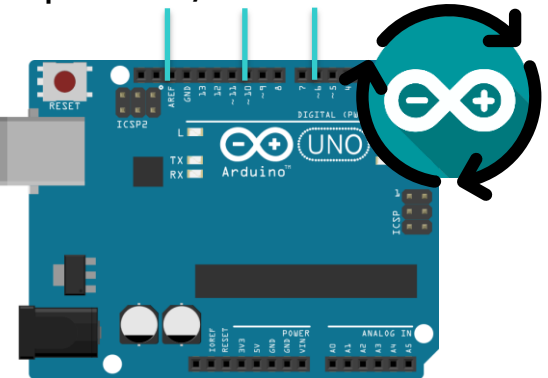
Ordinateur

Application LabVIEW cliente

Connexion USB / RS232

Communication Série

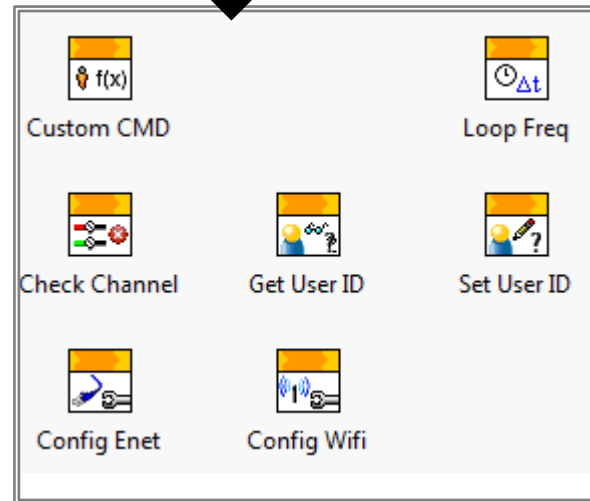
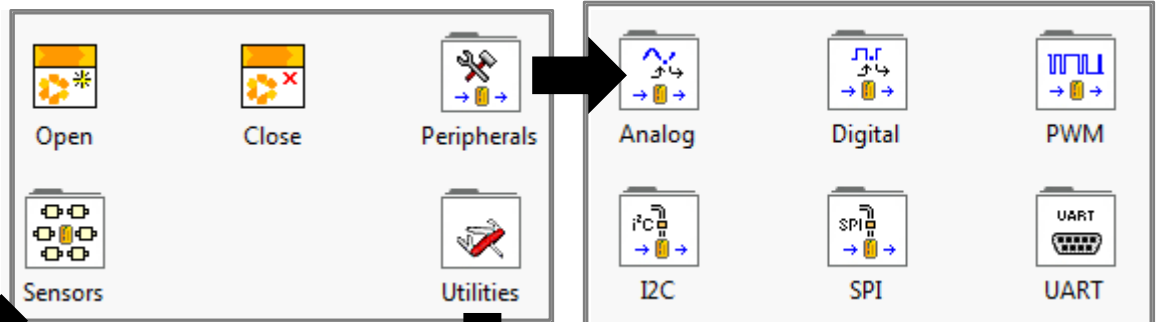
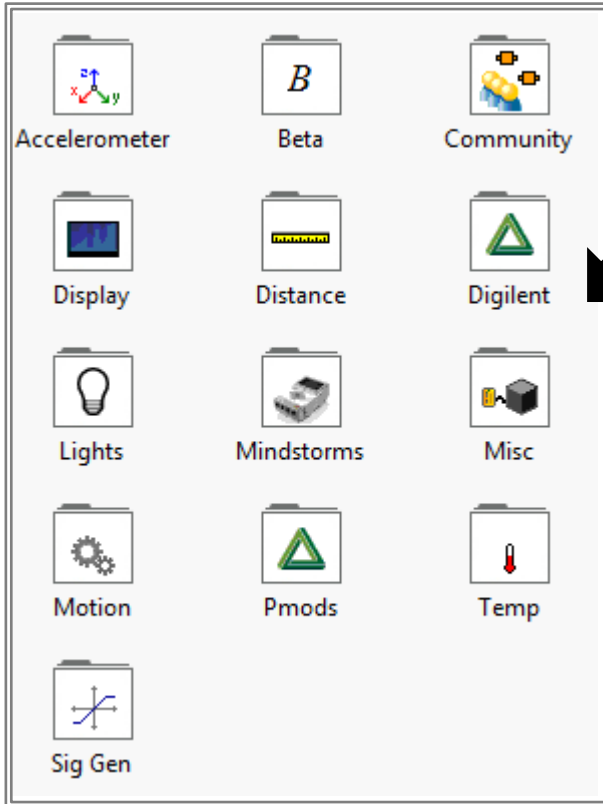
Capteurs / Actionneurs



Arduino Uno

Application serveur
entrée / sortie

❑ Librairie de VIs



Manual Blink Example

This example demonstrates how to blink an LED on a LINX device by clicking on an LED control in LabVIEW.

Instructions

1. Select the **Serial Port** associated with the LINX Device.
2. Select the **Digital Output Channel** connected to the LED.
3. Click the **Run Arrow**.

Loop Rate (Hz)

Circuit Schematic

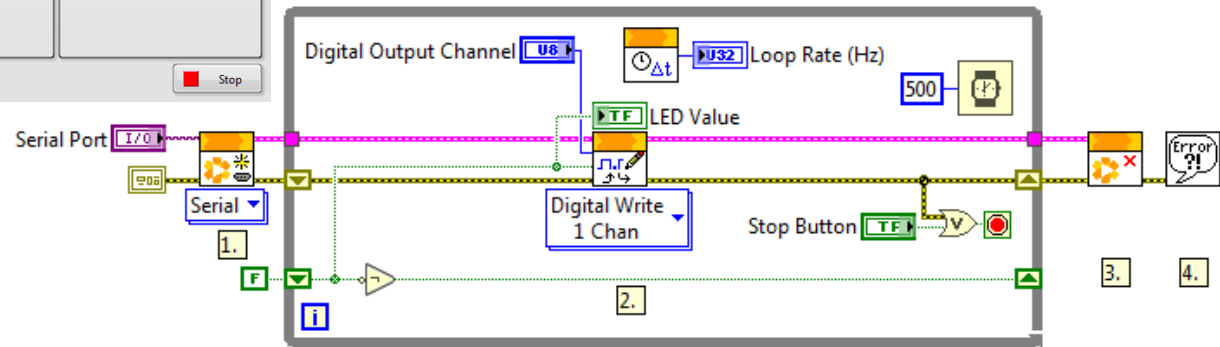
LINX Device Settings

Serial Port

Digital Output Channel

LED Status

■ Stop



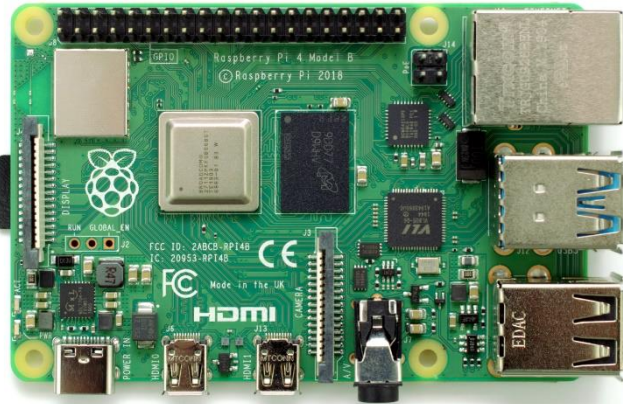
Démonstration

Démo Blink avec un Arduino et LabVIEW Community

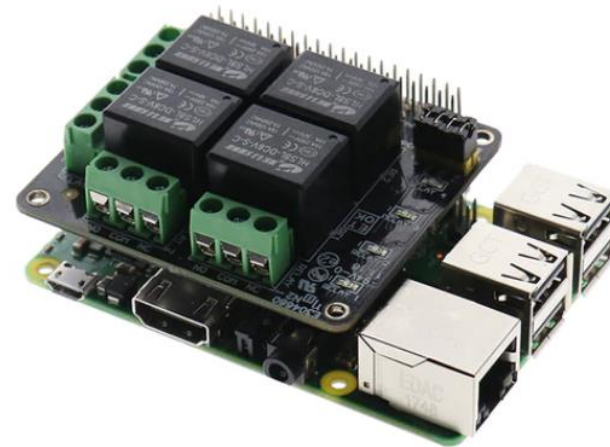
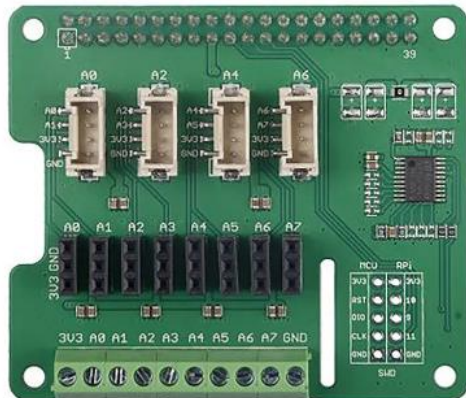
1. Open a connection to the LINX device.
3. Write the value to the specified DO channel.
4. Close the connection to the LINX device.
5. Handle Errors

- ❑ Récapitulatif
- ❑ Point fort
 - Faible coût
 - Petite carte d'acquisition
- ❑ Point faible
 - Pas de protection
 - Pas de code embarqué
 - Performance limitée

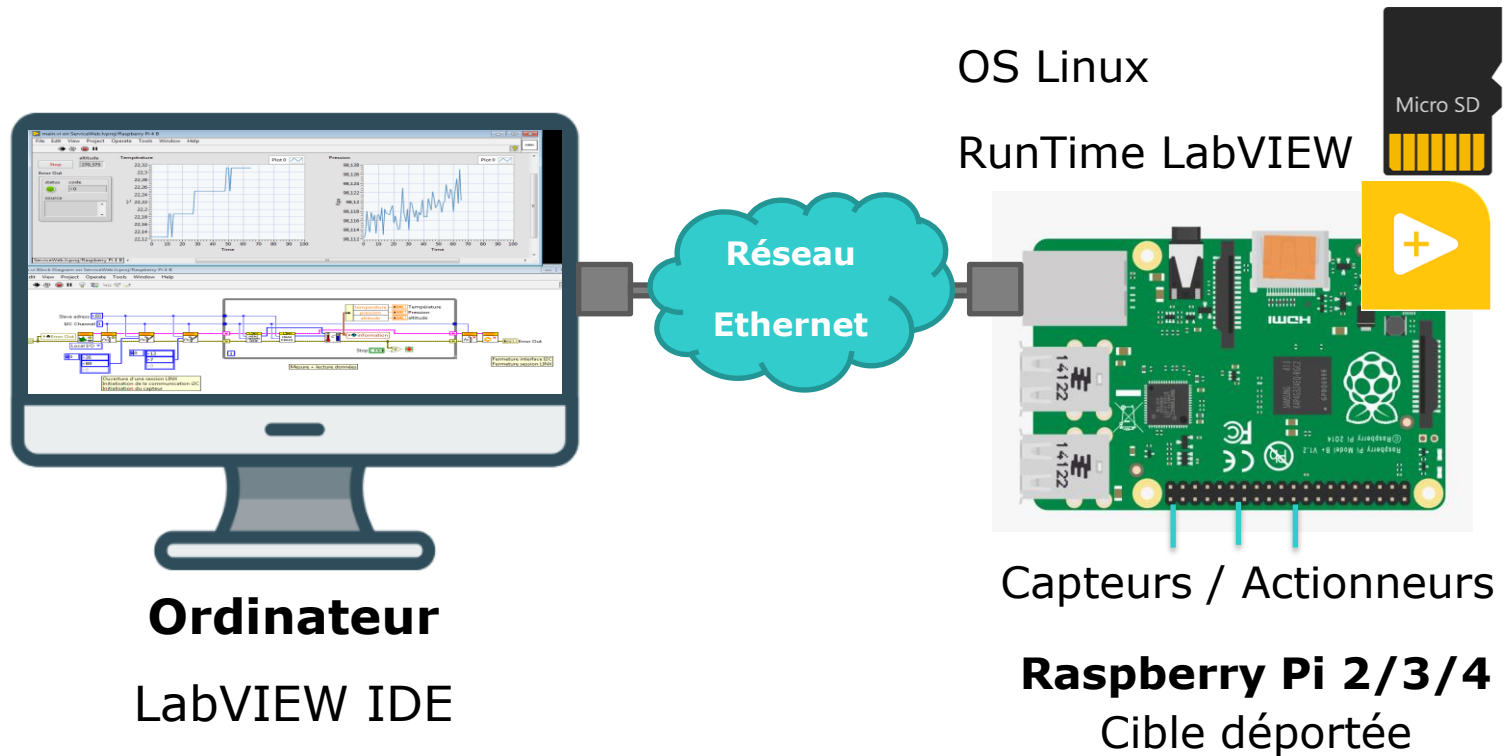
❑ Qu'est-ce qu'un Raspberry ?



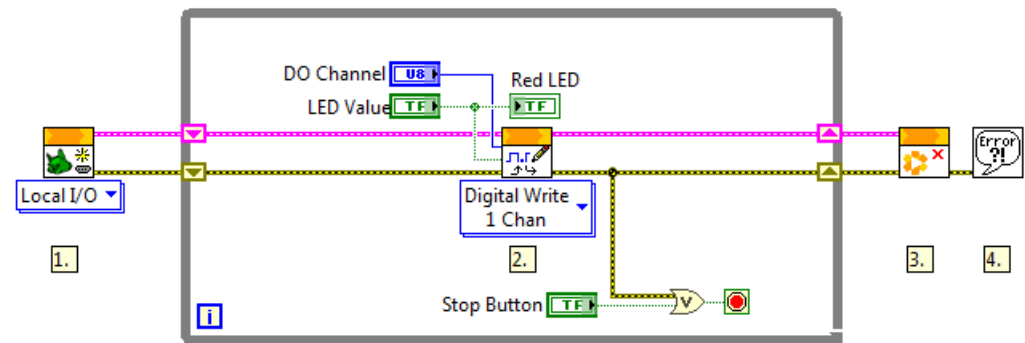
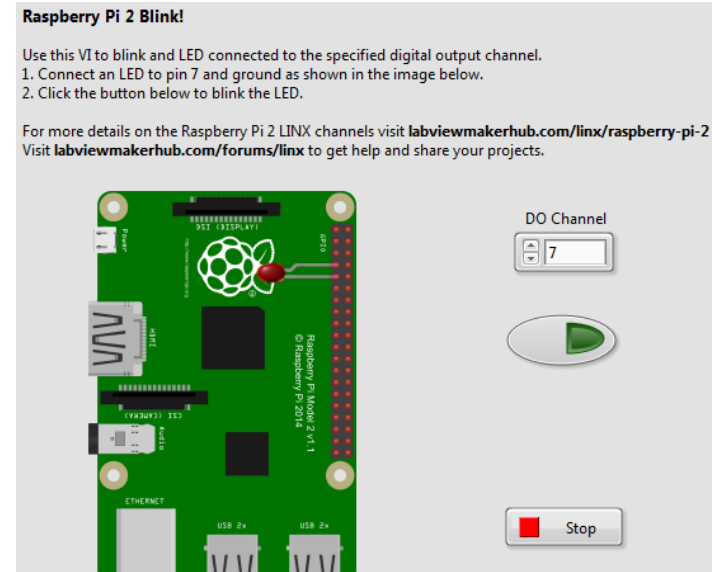
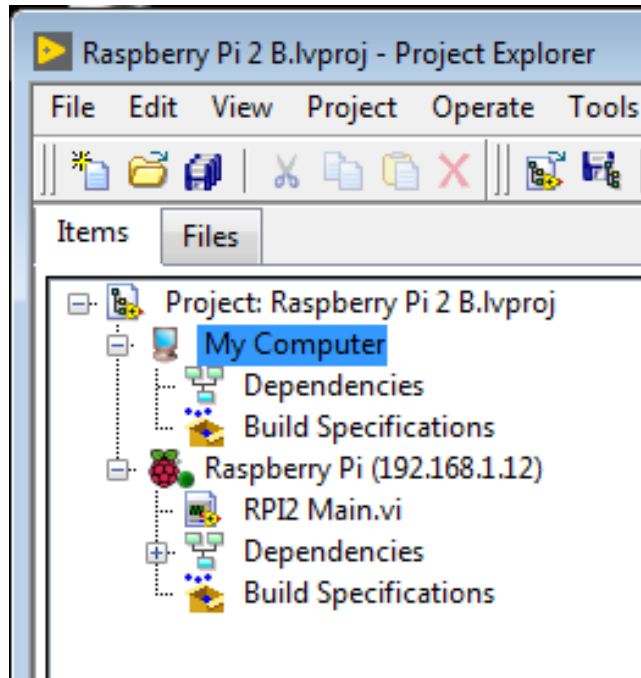
- Petit ordinateur Linux
- Microcontrôleur ARM
- Entrées/Sorties numérique 0-3.3V
- Communication UART, I2C et SPI



❑ Principe de fonctionnement



Exemple de code (Blink)



1. Open a reference to the LINX device I/O.
2. Write a digital value.
3. Close the reference to the LINX device I/O.
4. Report and errors.

❑ Embarquer un programme

The screenshot shows the LabVIEW project tree on the left and the 'My Real-Time Application Properties' dialog box on the right.

Project Tree:

- Project: Raspberry Pi 2 B.lvproj
 - My Computer
 - Dependencies
 - Build Specifications
 - Raspberry Pi (192.168.1.12)
 - RPI2 Main.vi
 - Dependencies
 - Build Specifications

Context Menu (over Build Specifications):

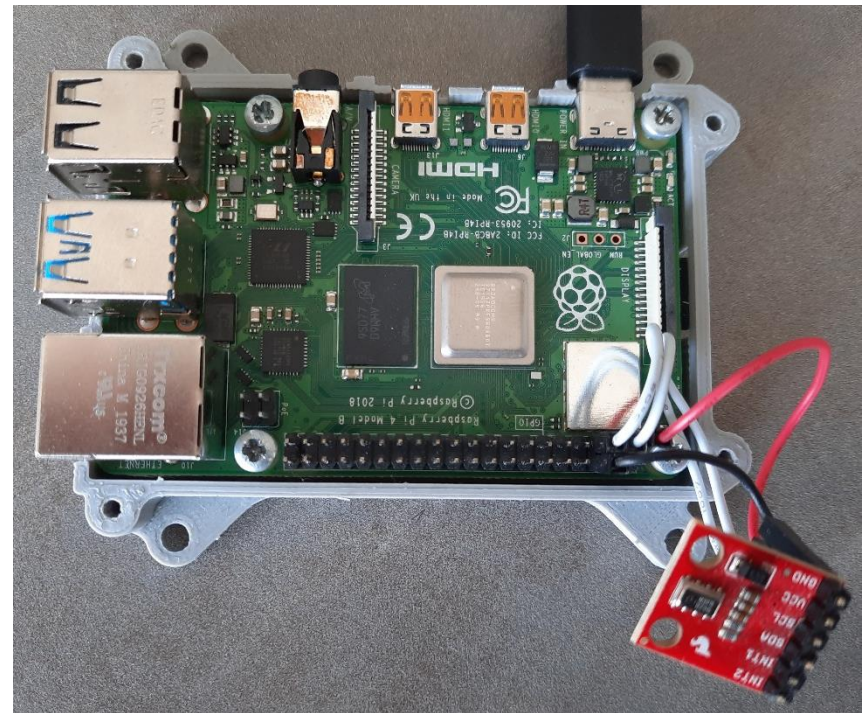
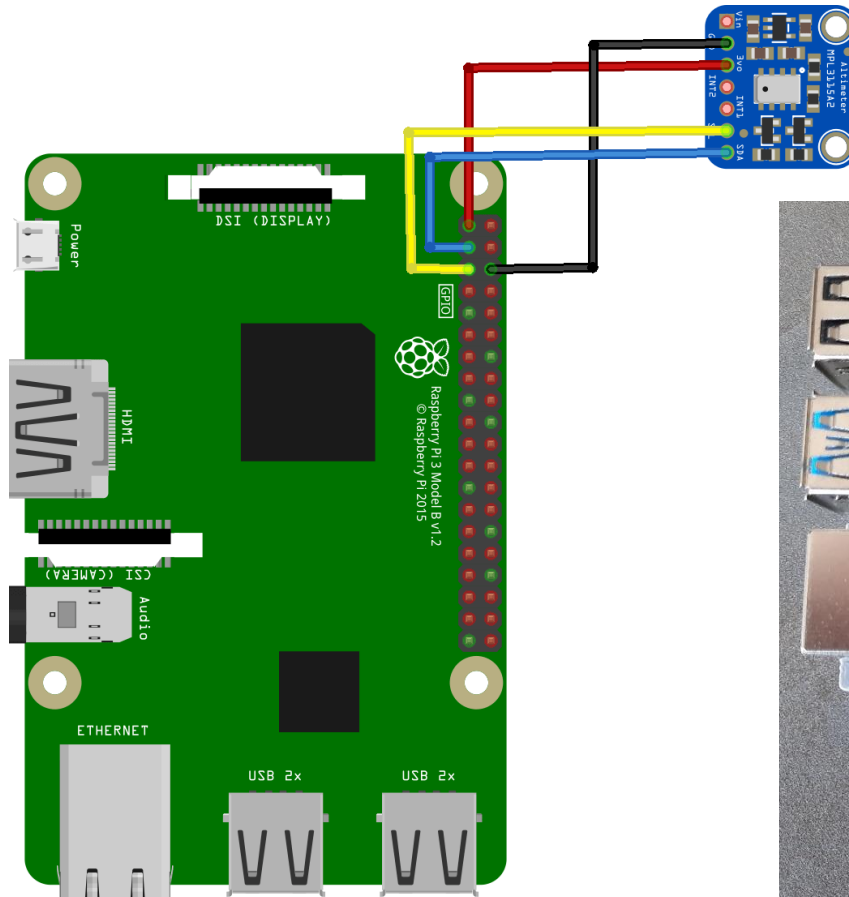
- New
 - Real-Time Application
 - Packed Library
 - Source Distribution
 - Zip File
- Arrange By
- Help...

My Real-Time Application Properties - Information tab:

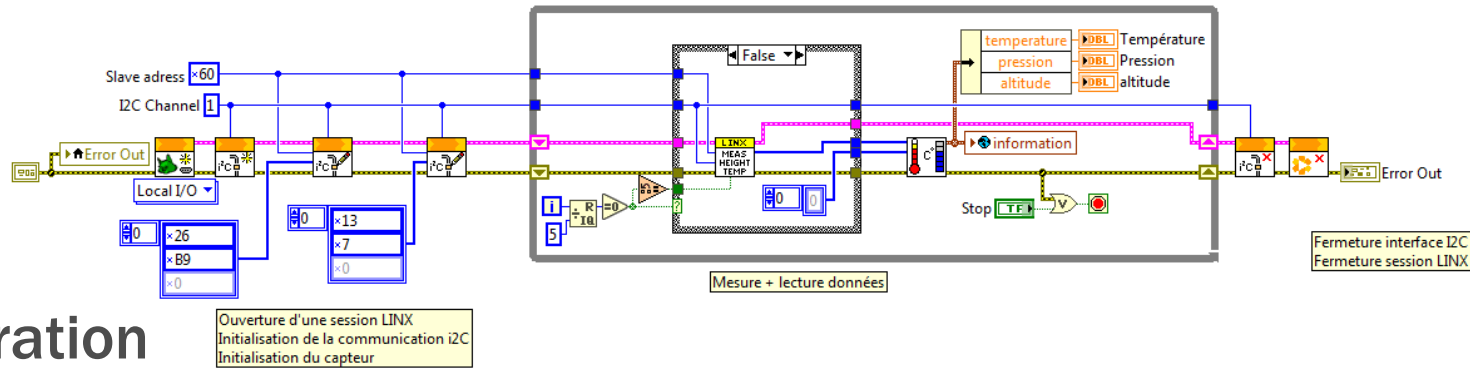
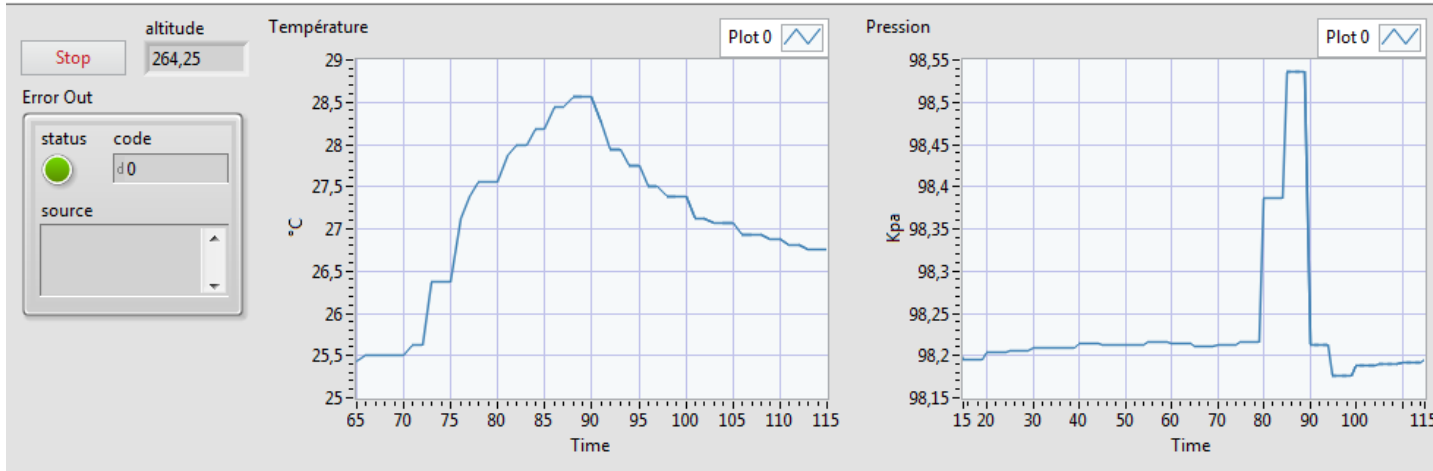
- Build specification name: My Real-Time Application
- Target filename: startup.rtexe
- Local destination directory: C:\builds\Raspberry Pi 2 B\Raspberry Pi\My Real-Time Application
- Target destination directory: /home/lvuser/natinst/bin
- Build specification description: (empty text area)

Buttons: Build, OK, Cancel, Help

Programme Test



fritzing



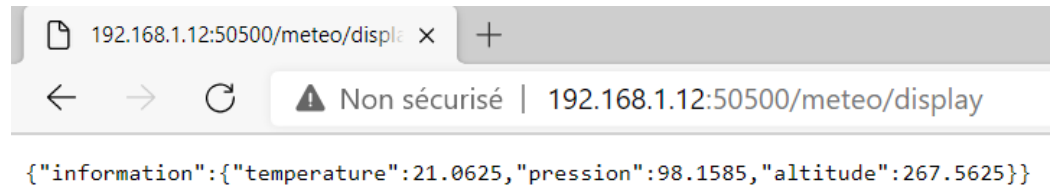
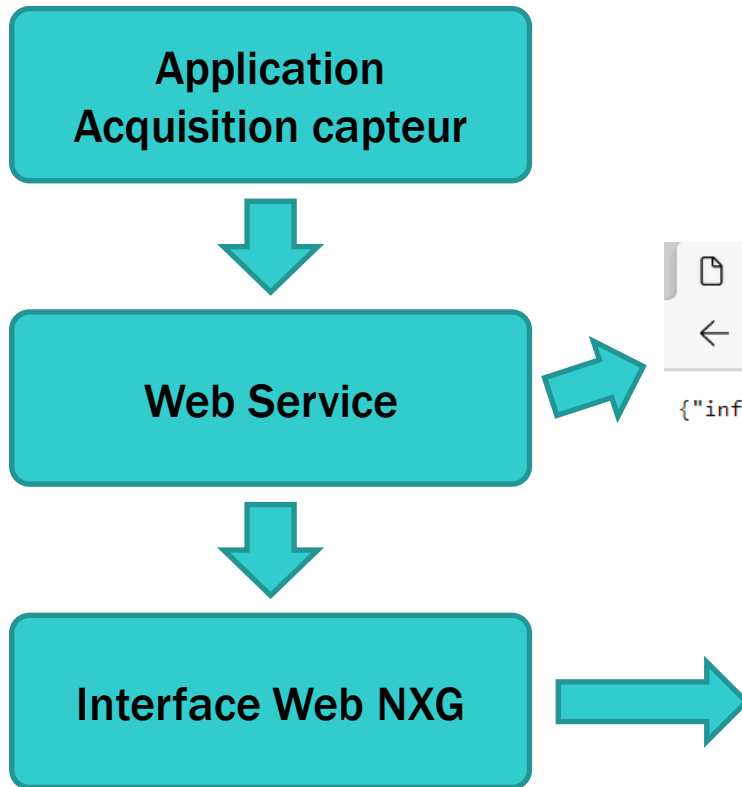
Démonstration

Ouverture d'une session LINX
Initialisation de la communication I2C
Initialisation du capteur

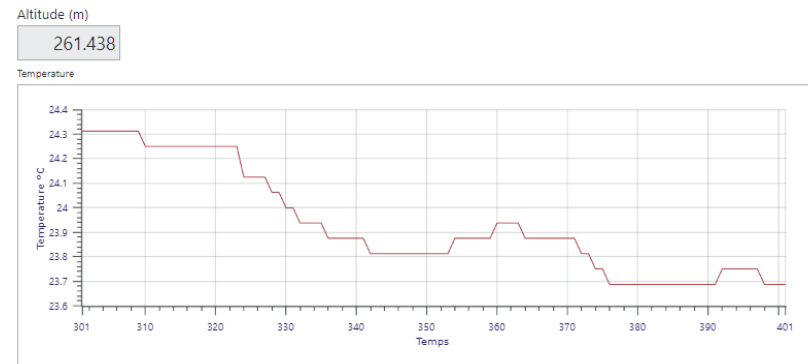
Démo capteur température et pression avec un Raspberry et LabVIEW Community

- ❑ Récapitulatif
- ❑ Point fort
 - Faible coût
 - Permet d'embarquer du code autonome LabVIEW
 - Vu depuis un projet LabVIEW comme une cible déporté
- ❑ Point faible
 - Limitation des entrées/sorties
 - Pas d'interface utilisateur

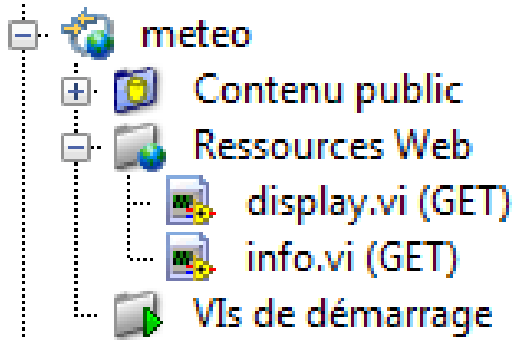
□ Architecture



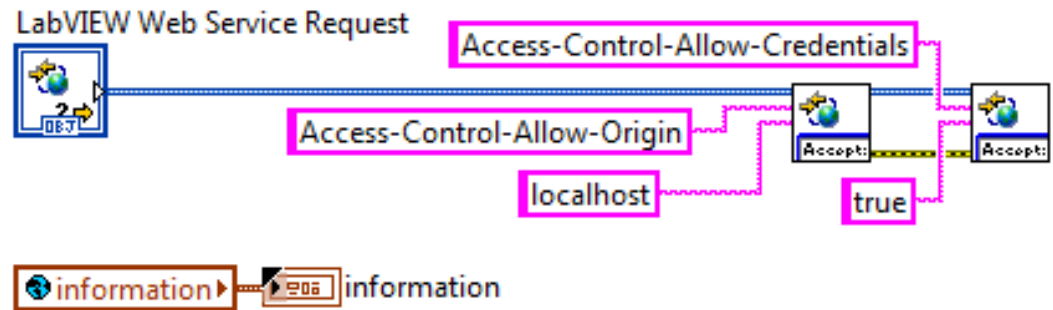
I2C sensors infos connected to Raspberry 4



❑ Web Service



Wire LabVIEW Web Service Request to web services palette VIs in order to read and write information about the HTTP request or web service.



❑ Attention à la configuration réseau



Cross-Origin Resource Sharing

❑ Interface Web

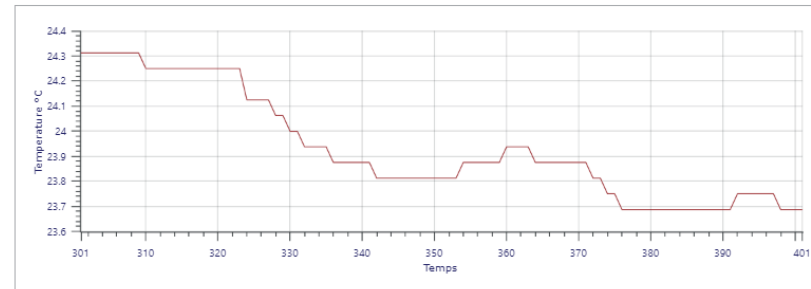


I2C sensors infos connected to Raspberry 4

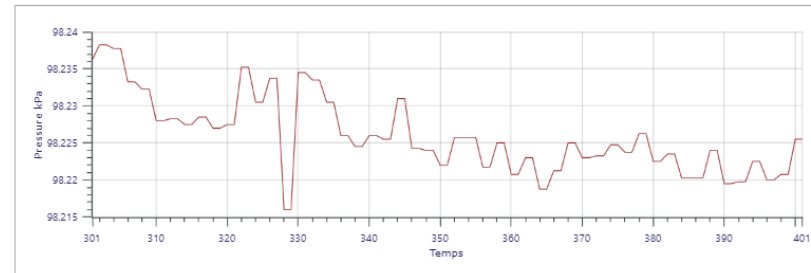
Altitude (m)

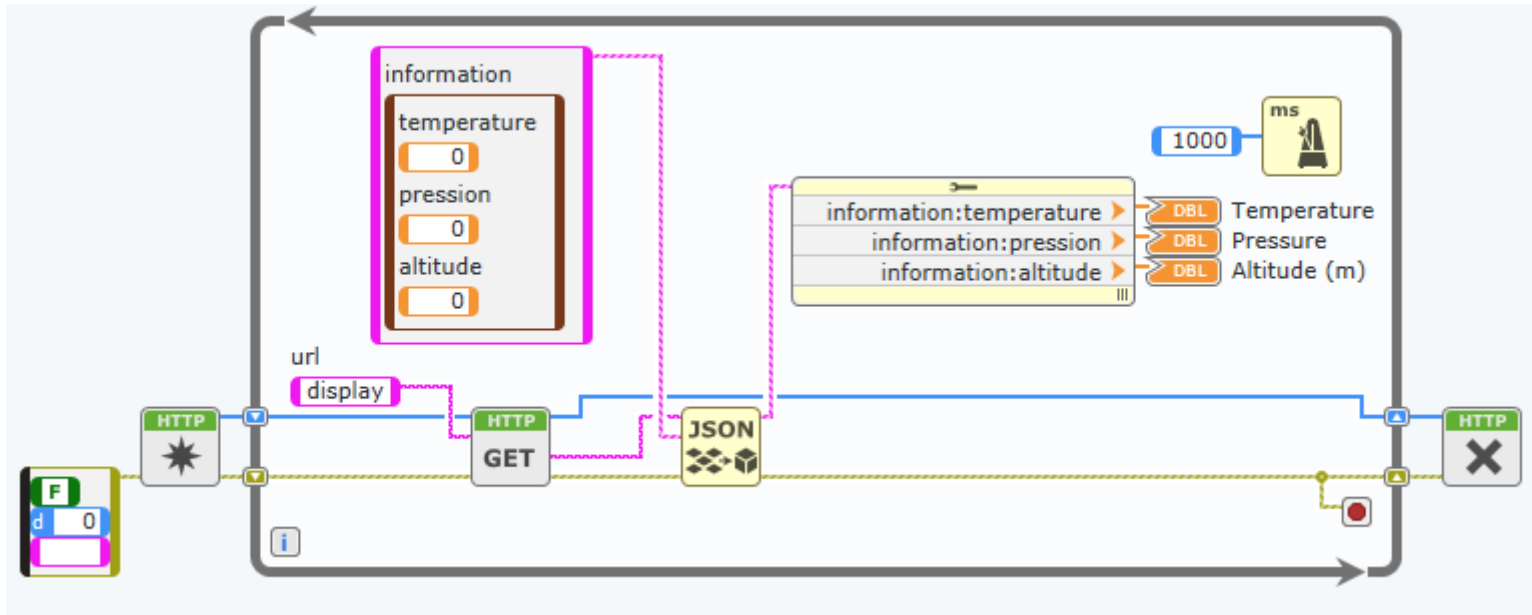
261.438

Temperature



Pressure





Démonstration

Interface web pour application autonome sur Raspberry



- ❑ Tutoriel Sam Sharp

[MAKE-ing with LabVIEW & Raspberry Pi: Part 3 – Raspberry Pi Setup | MediaMongrels](#)