# Déploiement des agents composant une Smart Grid dans des micro-contrôleurs

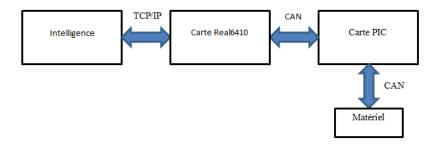
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## Le principe



## Le matériel

- Real6410
  - $\rightarrow$  mcp2515 : transforme du spi en CAN
- Carte dsPIC33F
  - ightarrow mcp2551 : transforme du spi en CAN

#### La communication IA - cartes

- Socket tcp
- Mise en forme des données pour le PIC

## La communication Real6410 - carte PIC

- Utilisation du bus CAN
- Résistant aux interférences
- Portée assez longue

## Côté Real6410

- $lue{}$  Driver inclus dans le noyau Linux ightarrow écriture sur le driver impossible
- Interface réseau non présente  $\rightarrow$  recompilation du noyau.
- Problème d'interface : le programme iproute non fonctionnel
- Interface 'vcan' non activée
- Interface CAN RAW non activée

## Côté PIC

- Module eCAN.
- Utilisation de la DMA.
- Initialisation avec identifiants standard.
- Envoie/réception de messages.
- Testé en mode loopback.

## Résultats

## Résultats

```
* DMA buffers for ECAN
ECAN1MSGBUF ecaplmsgBuf attribute ((space(dma),aligned(ECAN1 MSG BUF LENGTH*16)));
                 address = 0x4780. ecan1msqBuf[0][0] = 0x0108
/* Interrupt Se address = 0x4782, ecan1msgBuf[0][1] = 0x0000
No fast contex address = 0x4784, ecan1msgBuf[0][2] = 0x0008
void __attribut address = 0x4786, ecan1msgBuf[0][3] = 0x7A61 rupt(void)
                 address = 0x4788, ecan1msqBuf[0][4] = 0x7265
    /* check to address = 0x478A, ecan1msgBuf[0][5] = 0x7974
    if(C1INTFbi|address=0x478C, ecan1msgBuf[0][6]=0x6975
                 address = 0x478E, ecan1msqBuf[0][7] = 0x0000
         /*check address = 0x4790, ecan1msgBuf[1][0] = 0x0000
         if(C1RX address = 0x4792, ecan1msgBuf[1][1] = 0x0000
                 address = 0x4794, ecan1msqBuf[1][2] = 0x0000
                 address = 0x4796, ecan1msqBuf[1][3] = 0x0000
                 address = 0x4798, ecan1msgBuf[1][4] = 0x0000
         /* chec address = 0x479A, ecan1msgBuf[1][5] = 0x0000
         else if address=0x479C, ecan1msgBuf[1][6]=0x0000
                 address = 0x479E, ecan1msgBuf[1][7] = 0x0000
```

Résultats

#### Résultats

```
#include <p33FJ128MC8A3
                    address = 0x4780, ecan1msqBuf[0][0] = 0x0108
#endif /* PIC33FJ
                    address = 0x4782, ecan1msgBuf[0][1] = 0x0000
                    address = 0x4784, ecan1msqBuf[0][2] = 0x0008
#include<ecan.h>
                    address = 0x4786, ecan1msgBuf[0][3] = 0x7A61
#include<dma.h>
                    address = 0x4788. ecan1msqBuff01f41 = 0x7265
#include<string.h
                    address = 0x478A, ecan1msqBuf[0][5] = 0x7974
#include"ecan dma
                     address = 0x478C, ecan1msgBuf[0][6] = 0x6975
                    address = 0x478E, ecan1msqBuf[0][7] = 0x0000
 *bit timing confladdress = 0x4790, ecan1msgBuf[1][0] = 0x0108
                    address = 0x4792, ecan1msgBuf[1][1] = 0x0000
                    address = 0x4794, ecan1msqBuf[1][2] = 0x0008
                    address = 0x4796, ecan1msgBuf[1][3] = 0x7A61
FOSC( FCKSM CSEC
                                                                DENC ON )
                    address = 0x4798. ecan1msqBuf[1][4] = 0x7265
FPOR( FPWRT PWR1
                    address = 0x479A, ecan1msqBuf[1][5] = 0x7974
                     address = 0x479C, ecan1msgBuf[1][6] = 0x6975
                    address = 0x479E, ecan1msgBuf[1][7] = 0x0000
                    address = 0x47A0, ecan1msgBuf[2][0] = 0x0000
/* ECAN message b
                    address = 0x47A2, ecan1msgBuf[2][1] = 0x0000
#define ECAN1 MSG
                    address = 0x47A4, ecan1msgBuf[2][2] = 0x0000 | 81.
typedef unsigned
                     address = 0x47A6, ecan1msgBuf[2][3] = 0x0000
                    address = 0x47A8, ecan1msqBuf[2][4] = 0x0000
 * DMA buffers fo address = 0x47AA, ecan1msgBuf[2][5] = 0x0000
                     address = 0x47AC. ecan1msqBuff2][6] = 0x00...
ECAN1MSGBUF ecanlwgsgBuf attribute ((space(dma),aligned(ECAN1 MSG BUF LENGTH*16)));
```

#### Bilan

- Carte Real6410 non fonctionnelle en CAN
- Carte PIC fonctionnelle en CAN
- Carte Real6410 : une TX pour EE ?

Merci pour votre attention.