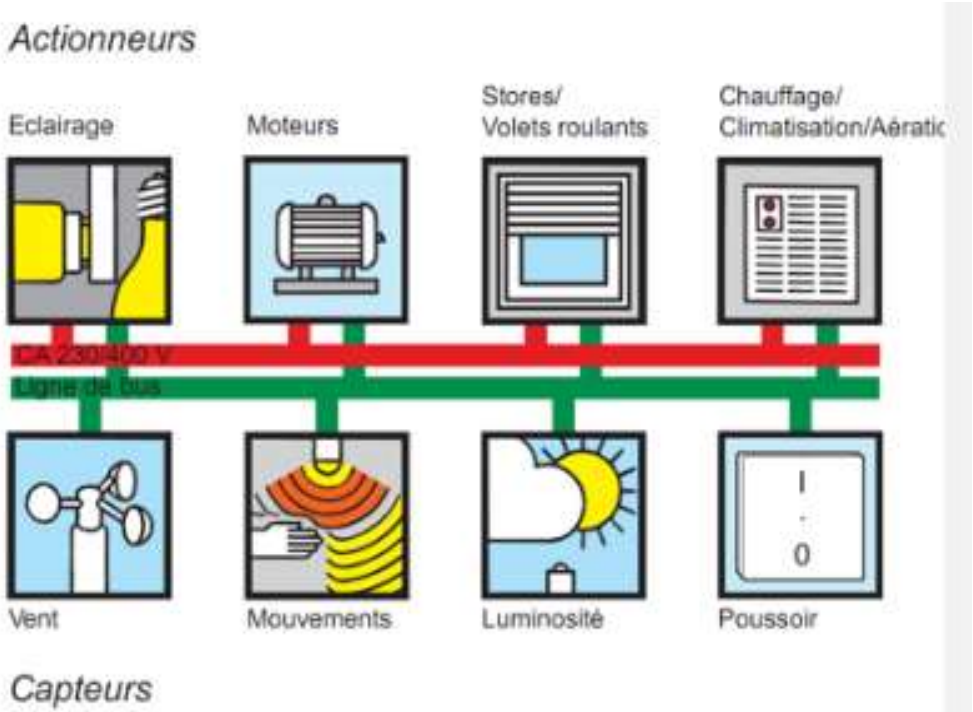
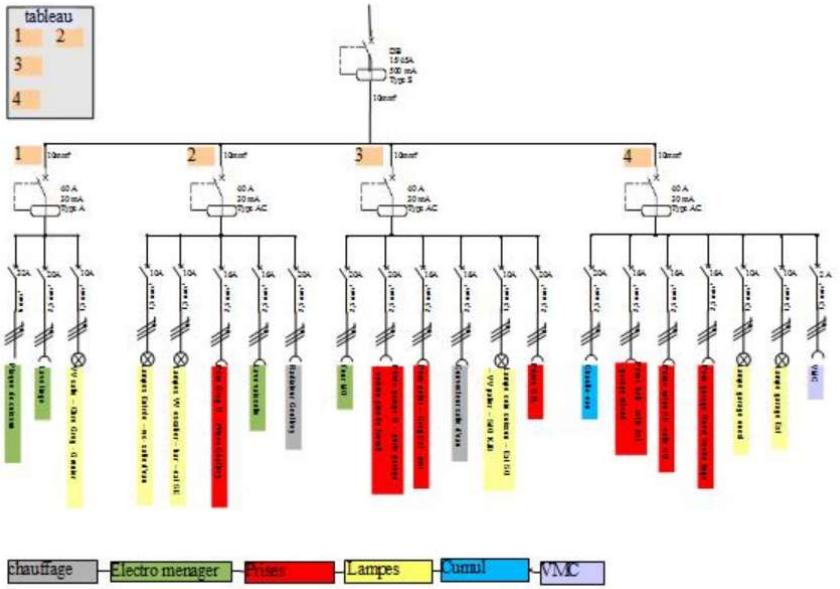
KNX gateway project

Kickoff meeting – 14.4.2023

Building automation or Domotics



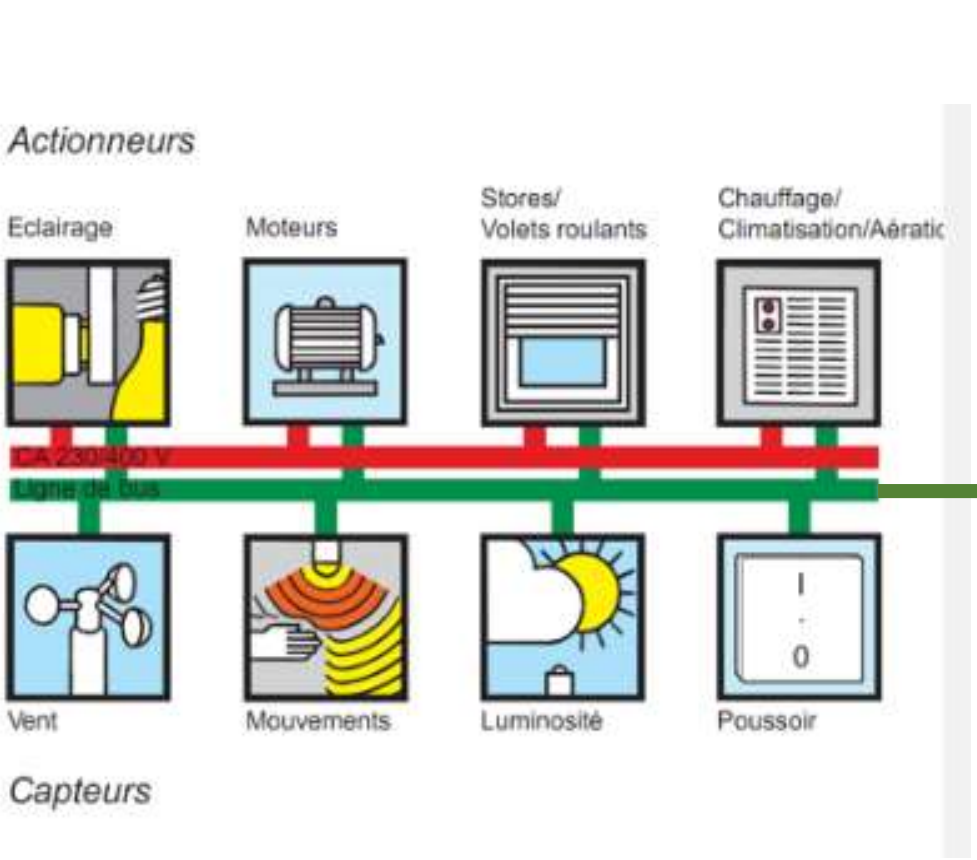
Nouvel architecture Electrique de bâtiment



Ancienne architecture Electrique de bâtiment

Nouvelle architecture
Avantage : modulable, connectivité, automatization, intelligente…
Inconvénient : le coût !

Target :
Access to KNX network via HMI interface or LAN/WAN devices



Embedded User interface

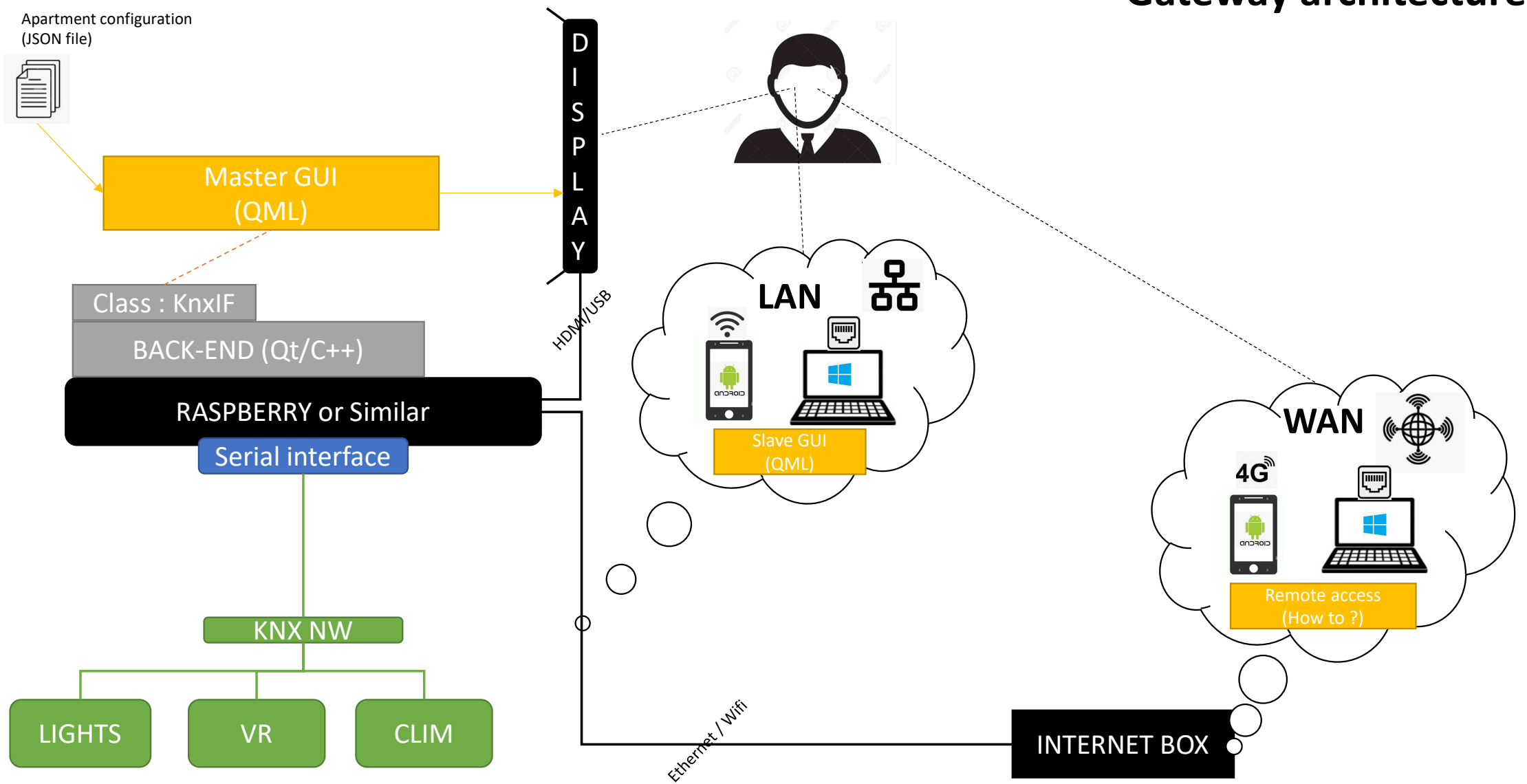
GATEWAY

Device access via LAN

4G

Device access via WAN

Gateway architecture



Project perimeter

- **Développer la master GUI avec QT/QML suivant des specifications en mode agile.**
- **Développer la slave GUI avec QT/QML pour Android platform (même fonctionalités que master GUI)**
- **Concevoir et développer le WAN remote access : pas de contrainte du la techno. choisie**

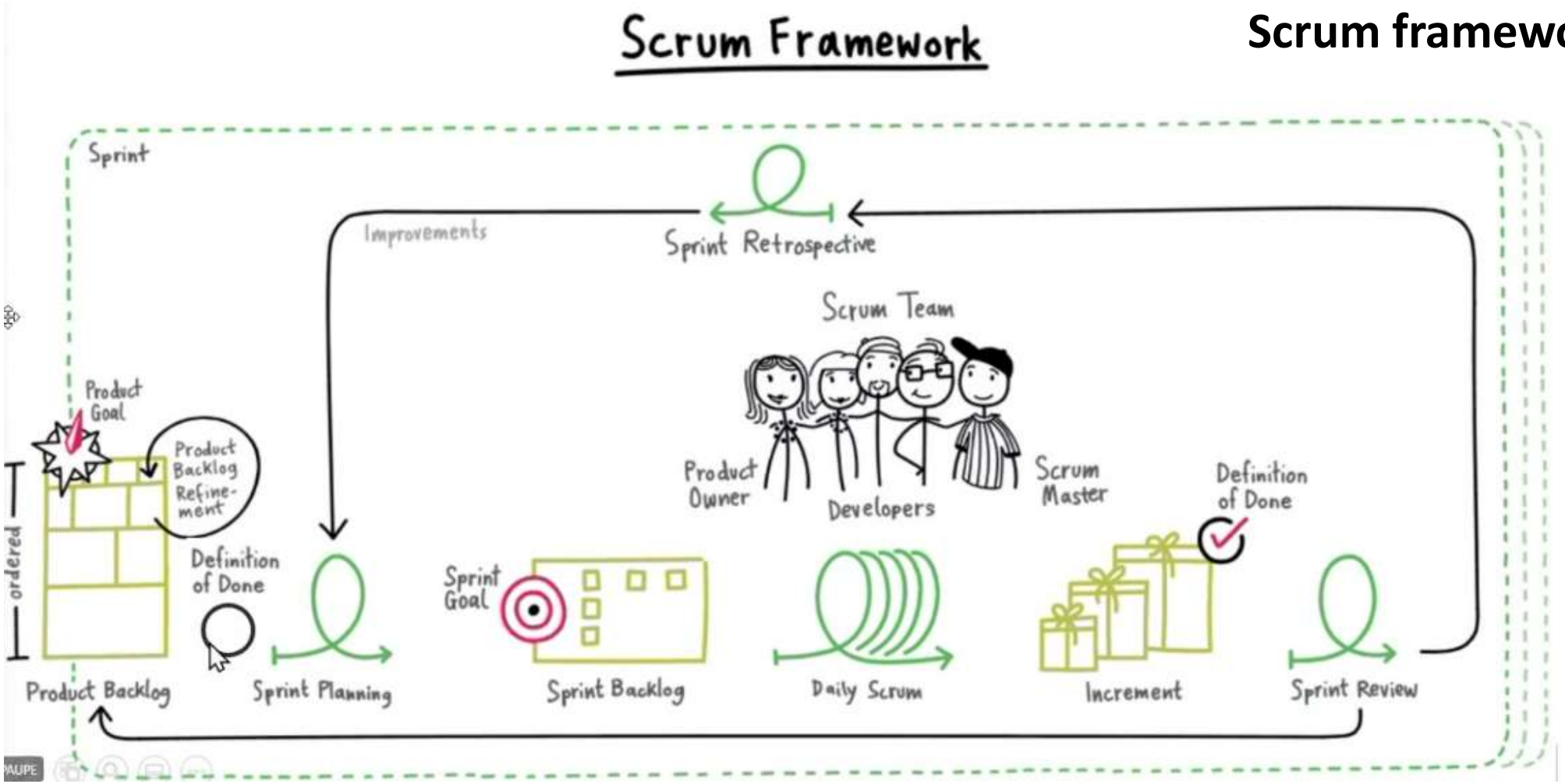
Is provided :

backend in offline mode, développé en C++/QT
example of GUI, développé en QT

Recommendation :

Utiliser au maximum le côté declarative de QML plus que le côté coding de QML avec Javascript

Scrum framework



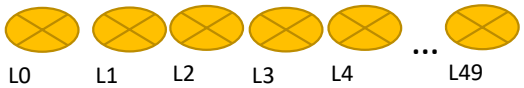
[Scrum : de quoi s'agit-il, comment cela fonctionne-t-il et en quoi est-ce génial ? (atlassian.com)]

Pour la prochaine !

	A faire pour la prochaine fois	QUI
1	QT/QML - montée en compétence	ALL
2	QT/QML IDE - installation (ver 6.3.0) - Packages : QtBase, QtQuick, QtCreator	ALL
3	Backend and example GUI – prise en main	ALL
4	Github repository – création et initialisation	EMA
5	Organisation - information sur agilité	ALL
6	Mise en place du workflow agilité	EMA

Backend and example Gui

Eclairage

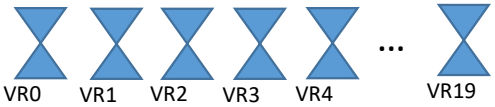


LightState[50] : false / true

Comm.

bConnexionLost :false/ true

Volets roulant



ShutterMoving [20] : 0 not moving, 1 moving up, 2 moving down

ShutterPosition[20] : 0 -> 100%

Backend

lightSwiched (Lx, state)

lightToSwitchOn (Lx)

lightToSwitchOff (Lx)

connexionLost (state)

connectme()

disconnectme()

shutterMoving (VRx, direction)

shutterMoved (VRx, position)

shutterToMoveUp (Lx)

shutterToMoveDown (Lx)

shutterToStop (Lx)

shutterToSetA (Lx, position)

Update()

lightState
as ListModel with
50 ListElement { Lx, state}

Update()

GUI Enabled / Disabled

Update()

shutterFB
as ListModel with
20 ListElement {Vx, position, state}

Apartment description

lightChambre
as ListModel with
3 ListElement {name, idx}

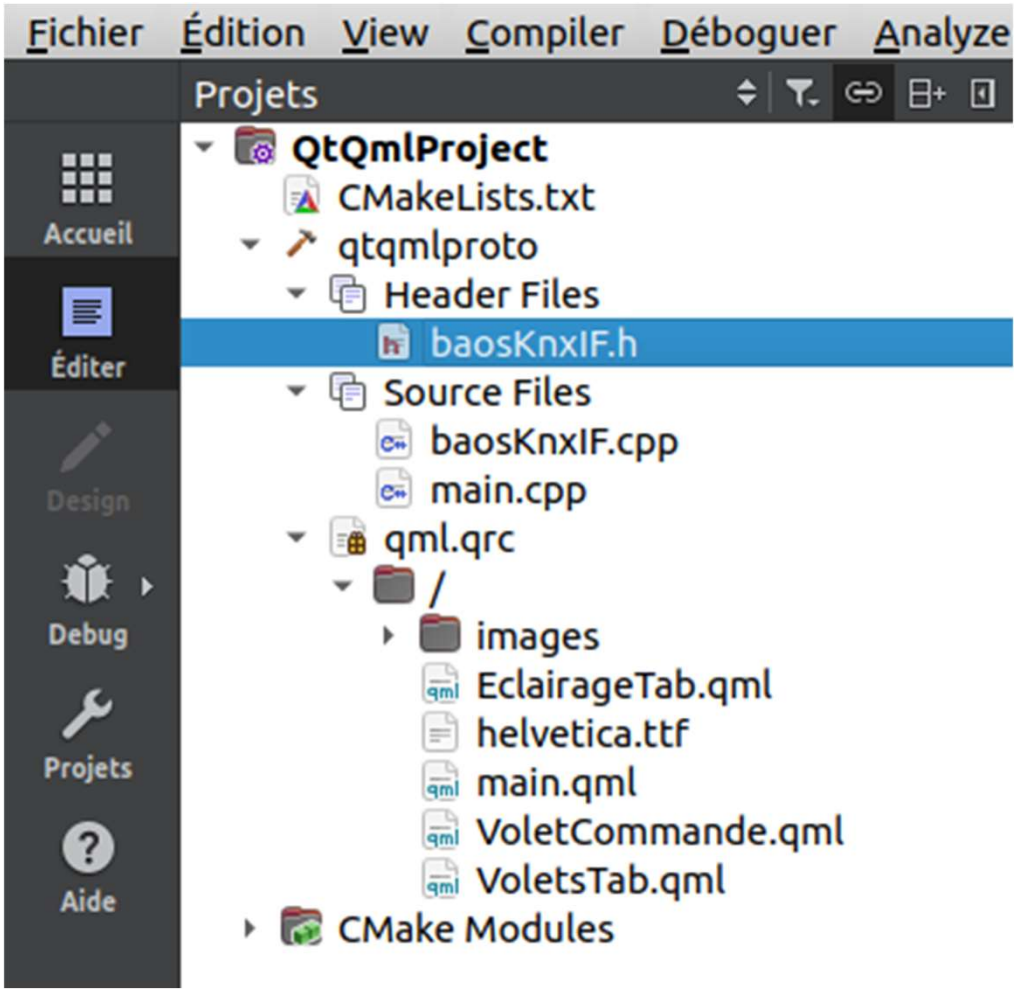
lightSalon
as ListModel with
3 ListElement {name, idx}

Apartment description

shutterChambre
as ListModel with
3 ListElement {name, idx}

shutterSalon
as ListModel with
3 ListElement {name, idx}

Frontend


Fichier
Édition
View
Compiler
Déboguer
Analyze
Projets
Accueil
Éditer
Design
Debug
Projets
Aide
QtQmlProject
CMakeLists.txt
qtqmlproto
Header Files
baosKnxIF.h
Source Files
baosKnxIF.cpp
main.cpp
qml.qrc
/
images
EclairageTab.qml
helvetica.ttf
main.qml
VoletCommande.qml
VoletsTab.qml
CMake Modules

Backend : baosKnxIF.h

```
class BaosKnxIF : public QObject
{
    Q_OBJECT

public:
    BaosKnxIF(QObject *parent = nullptr);
    ~BaosKnxIF();

signals:
    //signals to qml interface
    void lightSwiched(int id, bool enabled); // id(0 to 49) enabled (true/false)
    void shutterMoved(int id, unsigned int value); //id (0 to 19), value (0 to 100)
    void shutterMoving(int id, unsigned value); // id (0 to 19),value (0 = stopped, 1=up, 2=down)
    void connexionLost(bool lost); // false : connexion established, true : connexion lost

public slots :
    //slots from qml interface
    void lightToSwitchOn(int id); //id(0 to 49)
    void lightToSwitchOff(int id); //id(0 to 49)

    void shutterToSetAt(int id, unsigned int value); //id(0 to 19),value (0 to 100)
    void shutterToMoveUp(int id); //id(0 to 19)
    void shutterToMoveDown(int id); //id(0 to 19)
    void shutterToStop(int id); //id(0 to 19)
    void shutterTimeout();

    void connectme();
    void disconnectme();

private:
    void sendBool(int coNo, bool enabled);
    void send8BitUnsigned(int coNo, unsigned int value);
    void destroyConnection();
    void readStatus();

private:
    bool bConnexionLost;
    bool LightState[GEN_DB_LAMPS_MAX] = {false};

    unsigned int ShutterMoving[GEN_DB_SHUTTERS_MAX]={0}; // 0 : not moving, 1 = moving up, 2: moving dow
    unsigned int ShutterPosition[GEN_DB_SHUTTERS_MAX]= {0};
```

Signals & Slots(QT feature) allowing communication inter-object,
Or between C++ object and QML script :

- Signal : transport an information to another object
- Slots : functions called after external signal reception

- bConnexionLost : connexion state between master GUI and Backend
- LightState : state of each light (max light number 50)
- ShutterMoving : state of each shutter (UP/DOWN/STOP)
- ShutterPosition : position of each shutter (0-> 100%)

Example Gui : main.qml

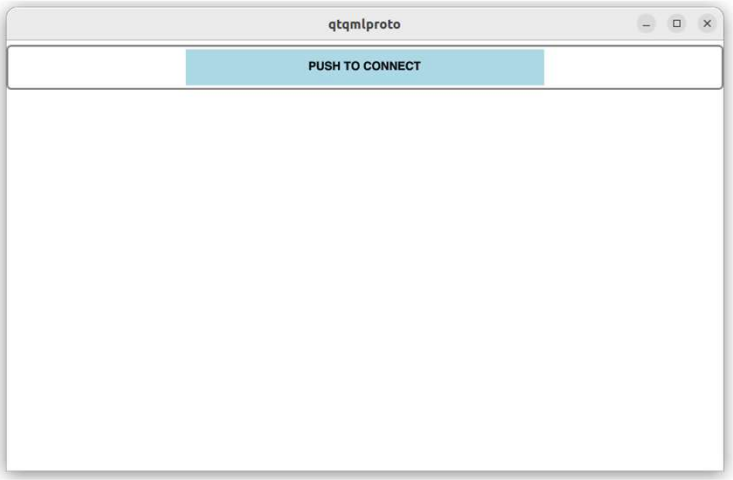
```
Window
{
////////////////// USER CONFIGURATION ////////////////////////////////
    // Lights mapping (Lx described dans Aljiza documentation)
    ///SALON
    ListModel
    { id: lightSalon...}

    // Shutters mapping (VRx described dans Aljiza documentation)
    ///SALON
    ListModel
    { id: shutterSalon...}
```

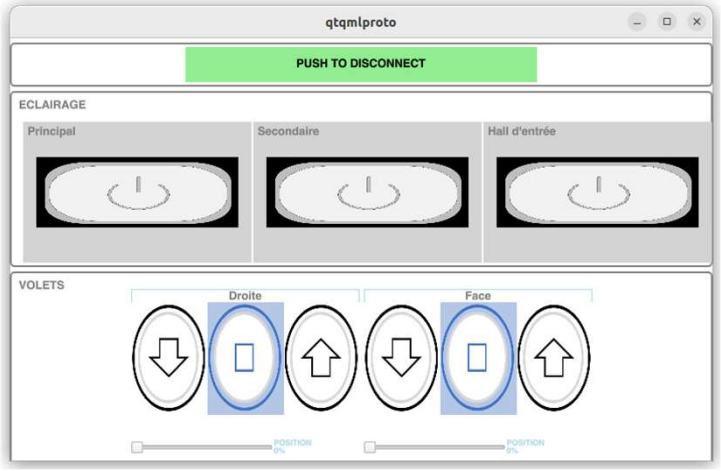
```
 ////////////////////////////// properties binded to back-open //////////////////////
 property bool knxConnexionLost : true

 property bool bEclairage1Salon : false
 property bool bEclairage2Salon : false
 property bool bEclairage3Salon : false

 property int iSliderVolet1ValueSalon : 0
 property int iSliderVolet2ValueSalon : 0
 property int iSliderVolet3ValueSalon : 0

 property int iSliderVolet1MovingSalon : 0
 property int iSliderVolet2MovingSalon : 0
 property int iSliderVolet3MovingSalon : 0
```

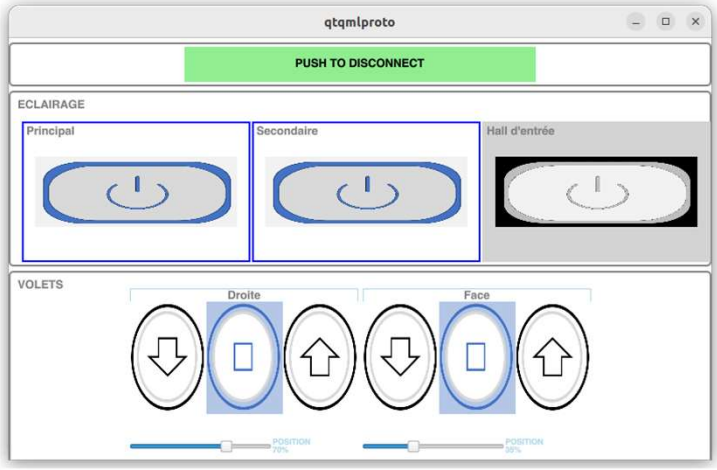
Example Gui : main.qml

```
// ////////////////////////// Main interface description //////////////////////////
id: windowQML
visible: true
width: 800
height: 480

FontLoader
{ id: fontHelvetica...}

property real fontsize: 10

Rectangle
{ id: connexionRec...}

Rectangle
{ id: salonLightRec...}

Rectangle
{ id: salonShuttertRec...}




//////////////////////////////// CONNECTION TO BACK-END ////////////////////////////

    ListModel
    { id: lightState...}

    ListModel
    { id: shutterFB...}

    Connections
   { ...}
```

Example Gui


qtqmlproto
PUSH TO CONNECT


qtqmlproto
PUSH TO DISCONNECT
ECLAIRAGE
Principal
Secondaire
Hall d'entrée
VOLETS
Droite
Face


qtqmlproto
PUSH TO DISCONNECT
ECLAIRAGE
Principal
Secondaire
Hall d'entrée
VOLETS
Droite
Face

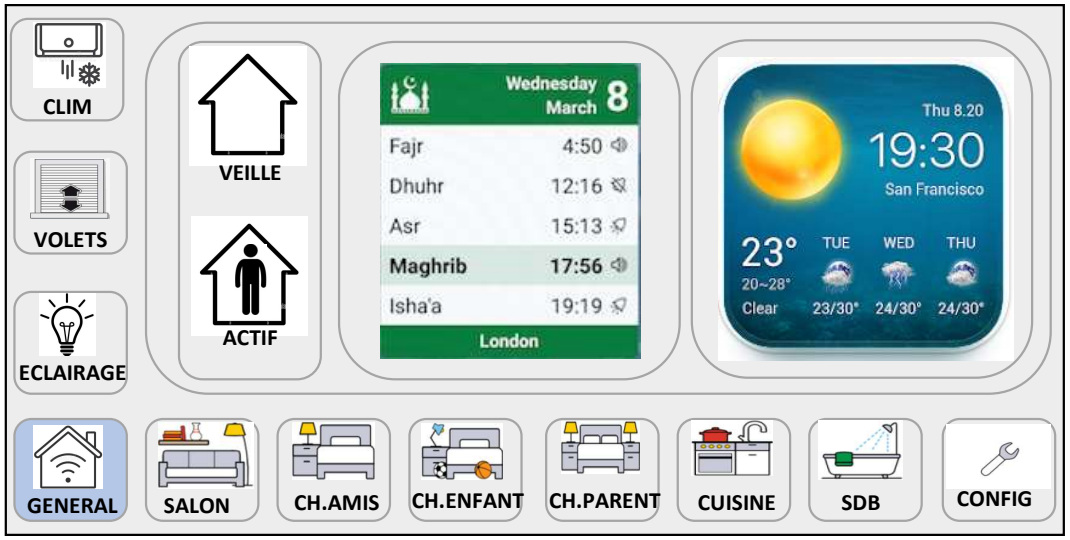
Master GUI specification

GENERAL

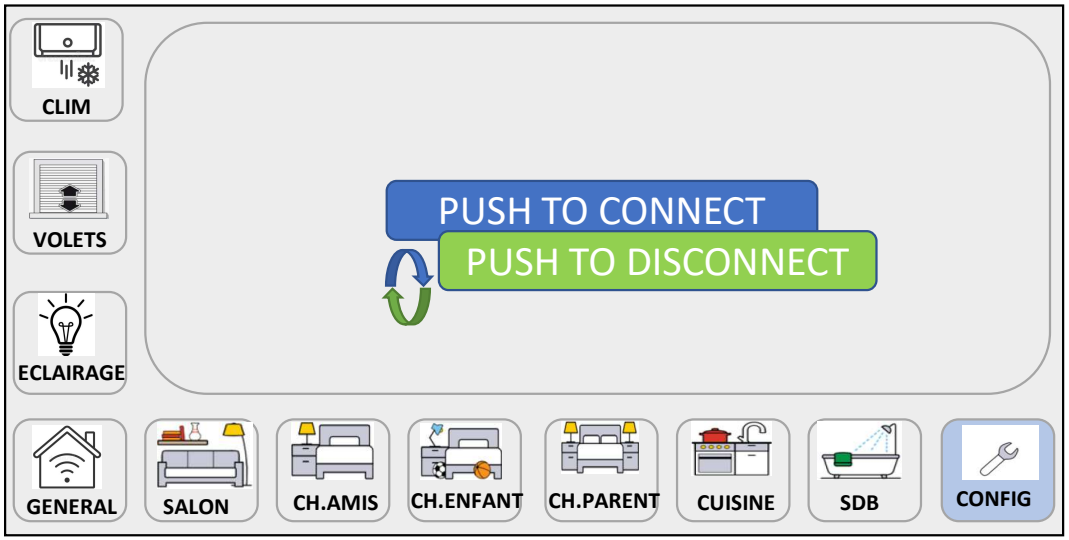
VEILLE (Push) — **VOLETS FERMES / ECLAIRAGE ETEINT DESACVTIVE « ACTIF MODE »**

ACTIVE (bascule) — **SI(JOUR) VOLETS OUVETS / ECLAIRAGE ETEINT**
SI(NUIT) VOLETS FERMES

JOUR/NUIT : **basé sur levée / couhée du soleil**

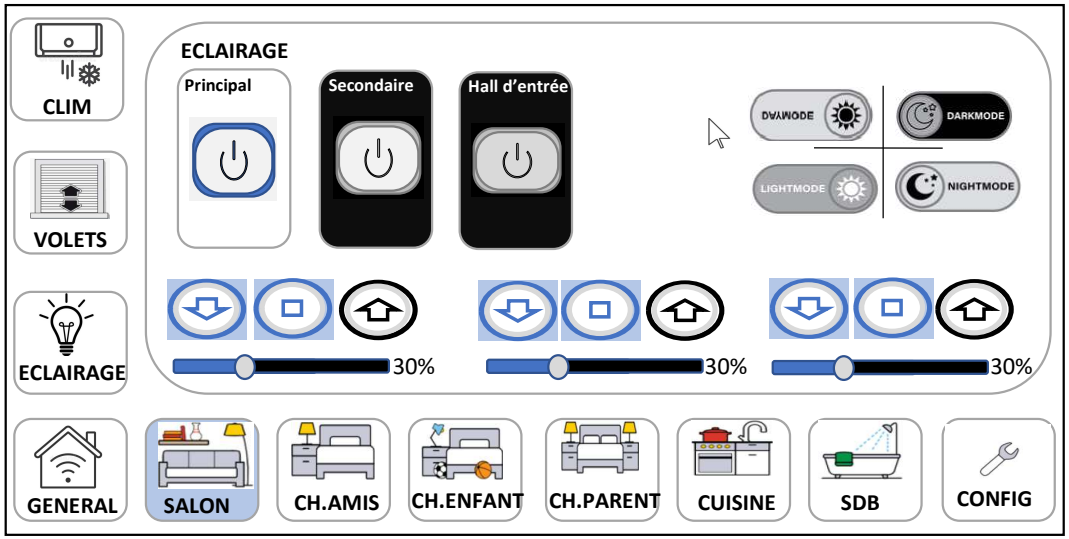


CONFIG

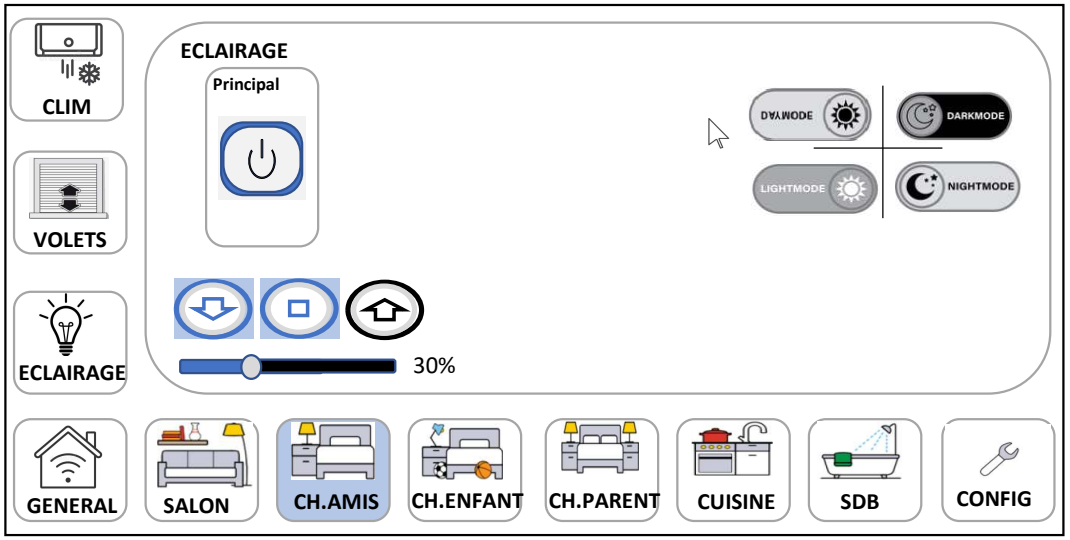

CLIM
VOLETS
ECLAIRAGE
PUSH TO CONNECT
PUSH TO DISCONNECT
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

SALON

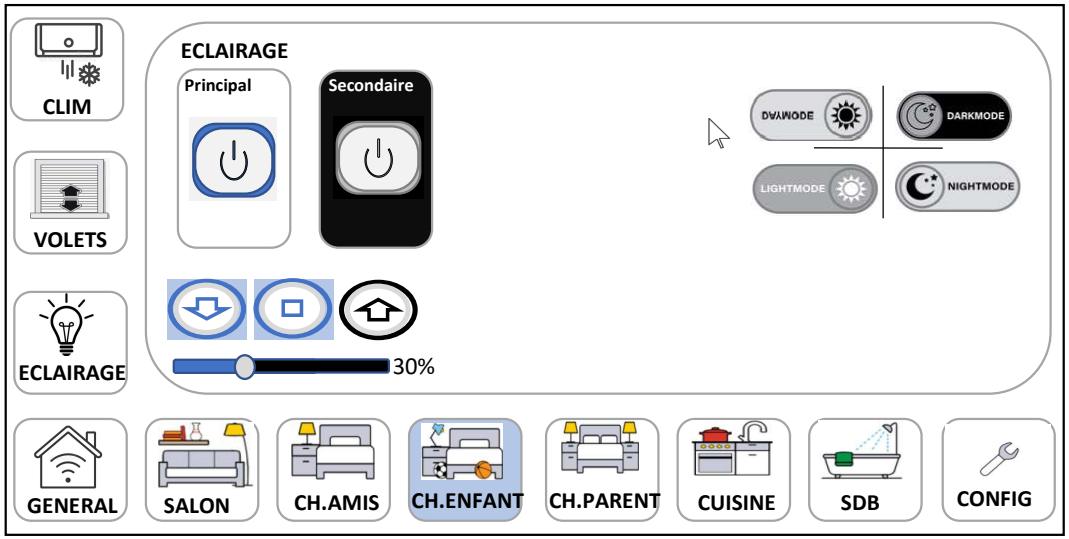
DAY MODE Volets ouverts, Eclairage éteint
NIGHT MODE Volets fermés, Eclairage allumé
LIGHT MODE Volets ouverts, Eclairage allumé
DARK MODE Volets fermés, Eclairage éteint



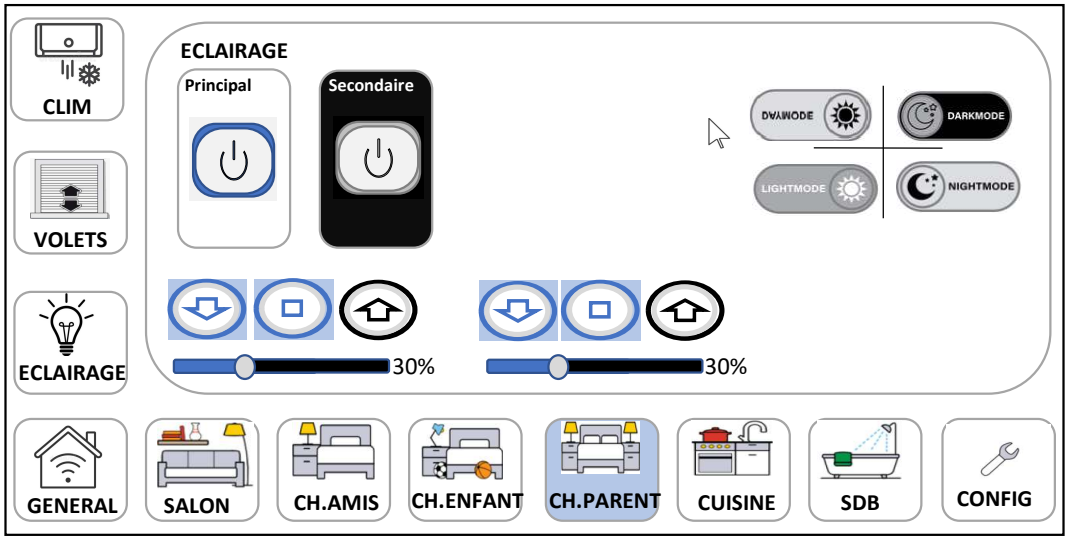
CH.AMIS


CLIM
VOLETS
ECLAIRAGE
ECLAIRAGE
Principal
30%
DARKMODE
LIGHTMODE
NIGHTMODE
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

CH.ENFANT


CLIM
VOLETS
ECLAIRAGE
ECLAIRAGE
Principal
Secondaire
30%
DARKMODE
LIGHTMODE
NIGHTMODE
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

CH.PARENT


CLIM
VOLETS
ECLAIRAGE
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Principal
Secondaire
DAYMODE
DARKMODE
LIGHTMODE
NIGHTMODE
30%
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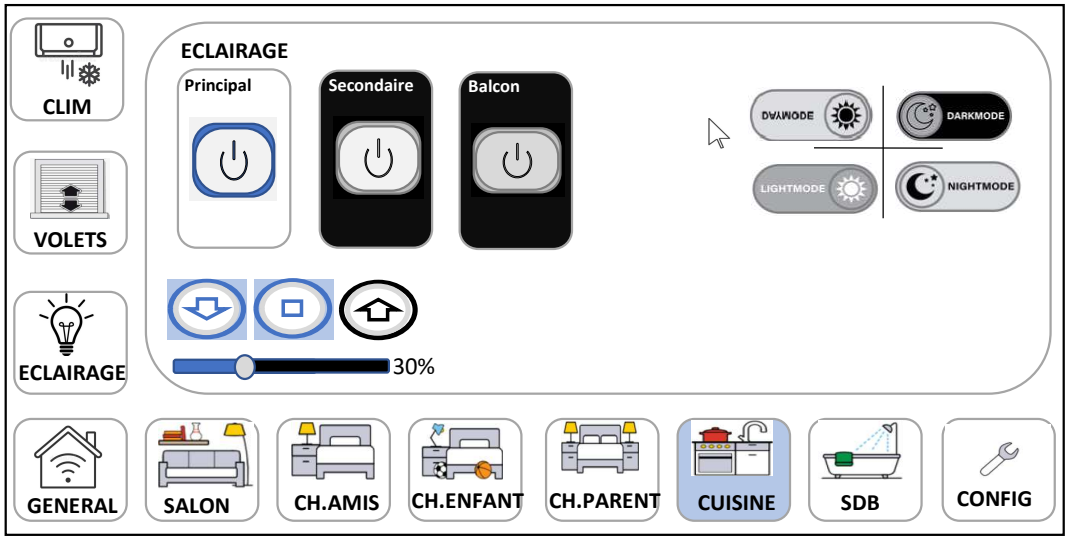
CUISINE
SDB
CONFIG

CUISINE


CLIM
VOLETS
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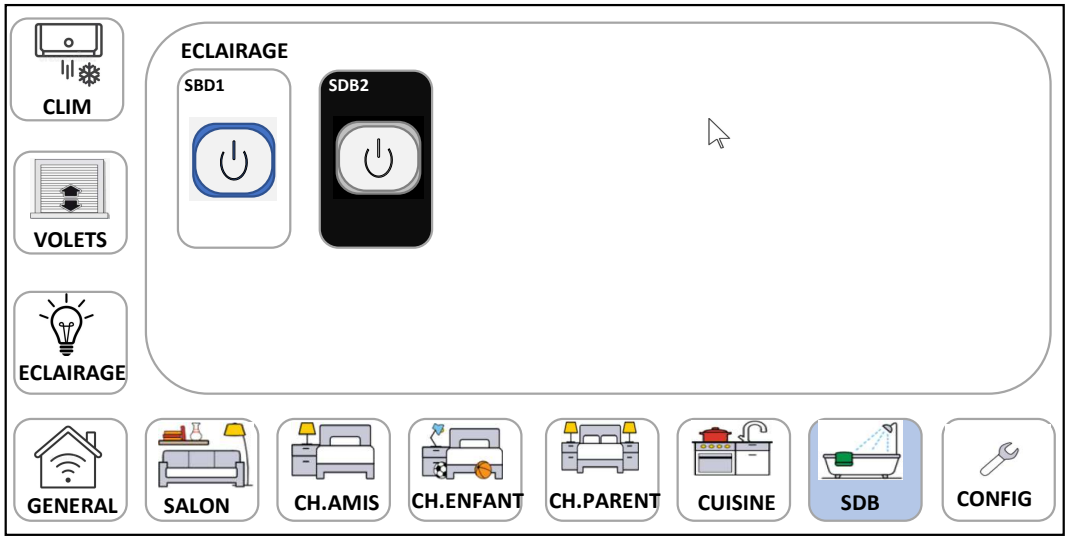
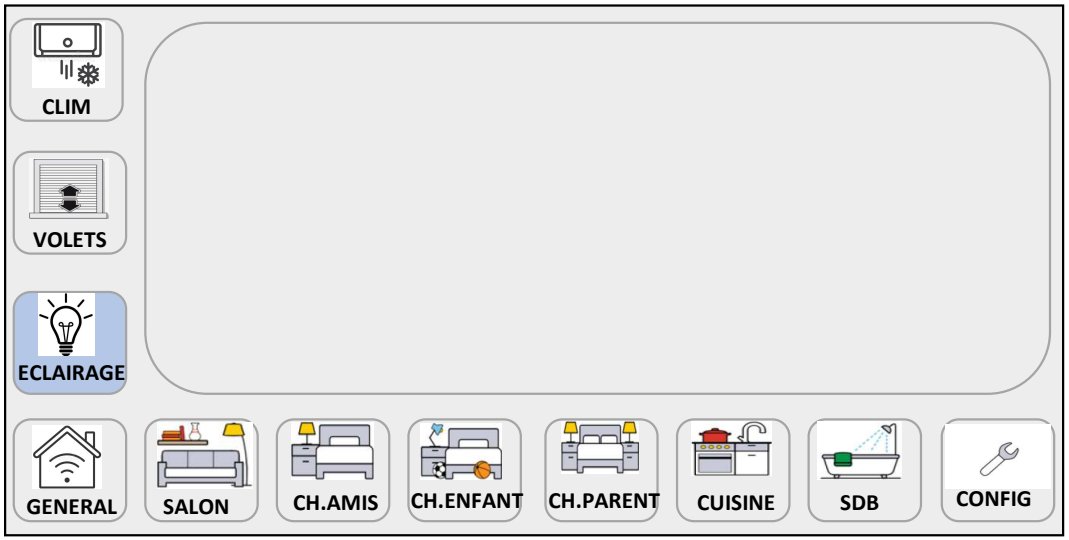
ECLAIRAGE
Principal
Secondaire
Balcon
DARKMODE
LIGHTMODE
NIGHTMODE
30%
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

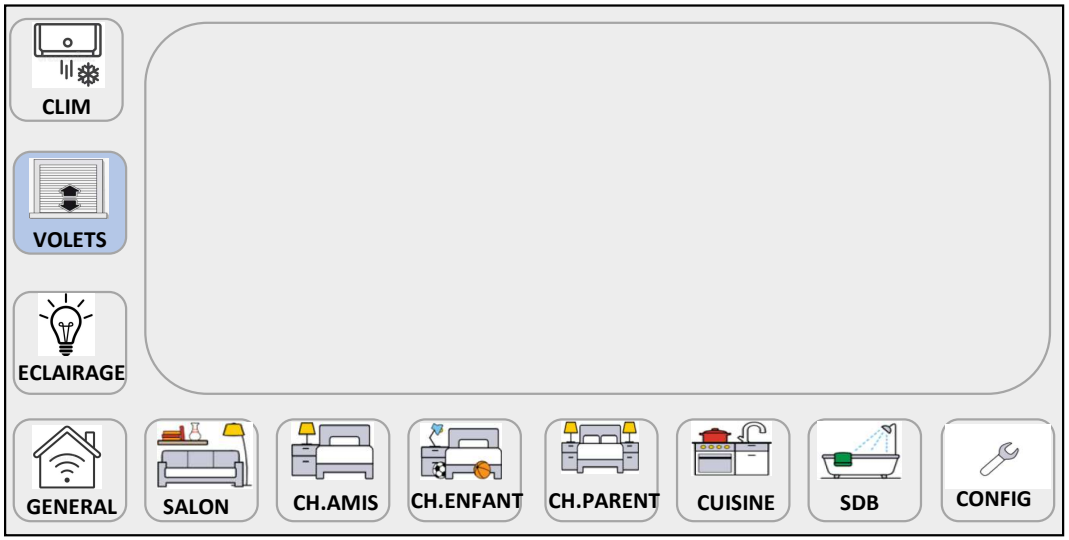
SDB


CLIM
VOLETS
ECLAIRAGE
ECLAIRAGE
SBD1
SDB2
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

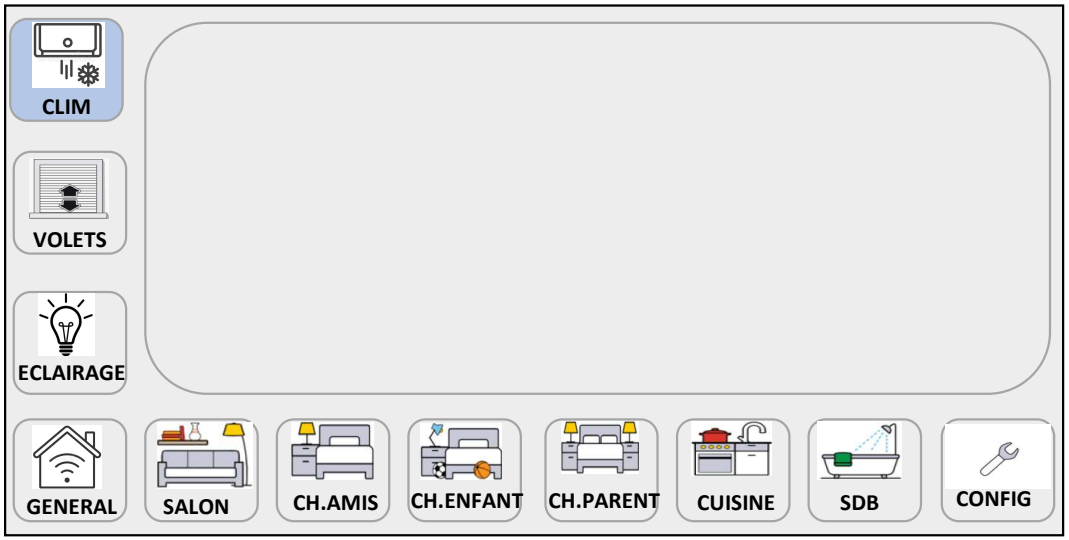
ECLAIRAGE


CLIM
VOLETS
ECLAIRAGE
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

VOLETS


CLIM
VOLETS
ECLAIRAGE
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG

CLIM


CLIM
VOLETS
ECLAIRAGE
GENERAL
SALON
CH.AMIS
CH.ENFANT
CH.PARENT
CUISINE
SDB
CONFIG