Smart Building Lab

Part1: KNX

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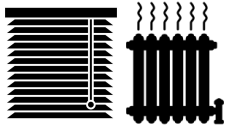
L'avenir est à créer
h e p i a
Haute école du paysage, d'ingénierie
et d'architecture de Genève

Lab 1 : Smart Building

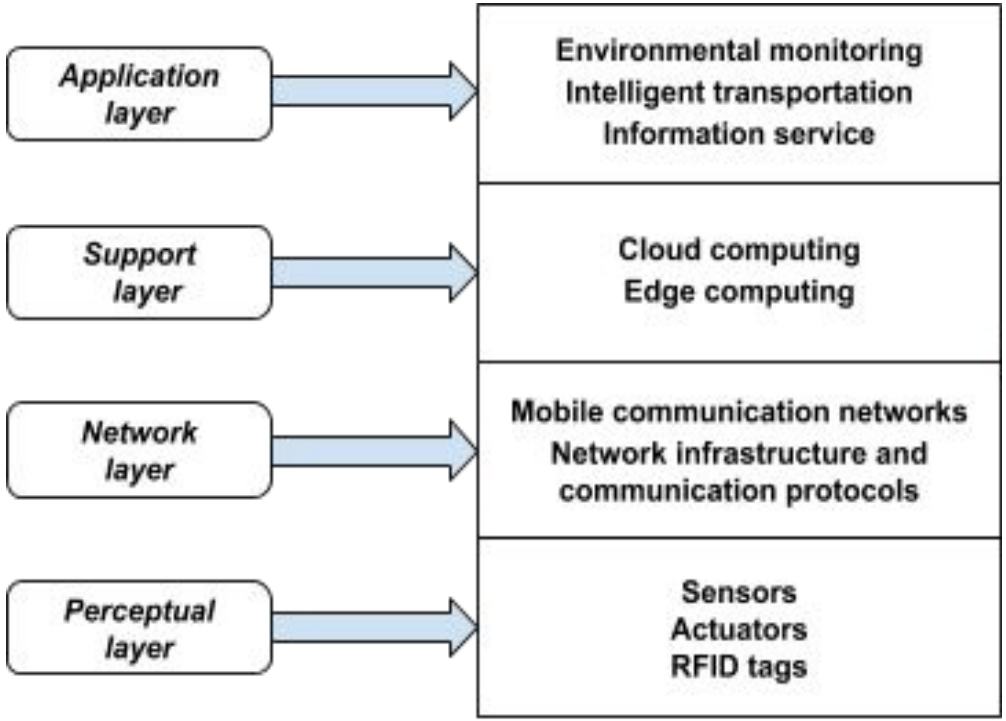
Smart Building Software
(High Level Functionalities)

KNX
Network

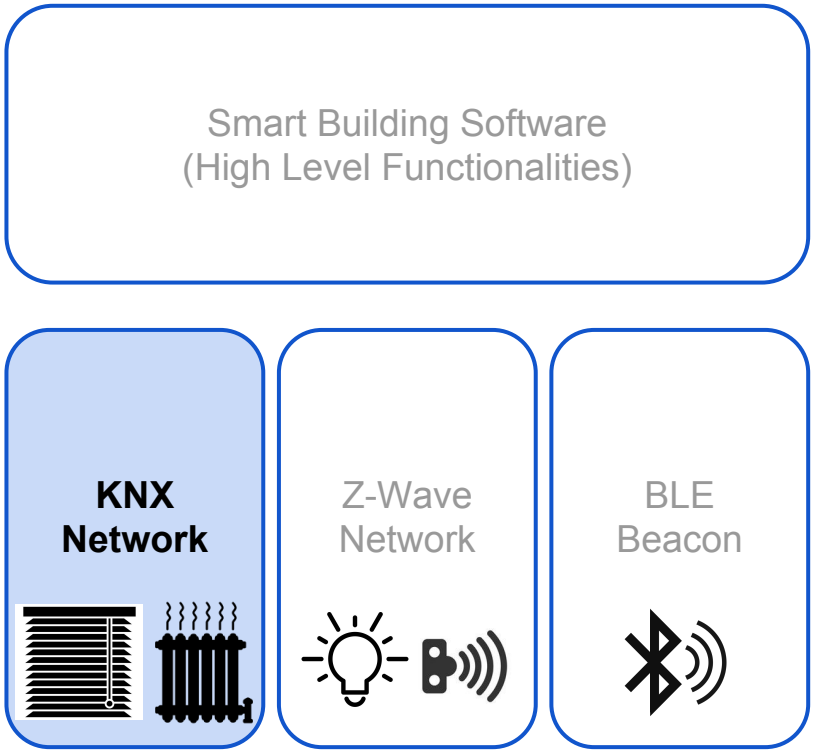


Z-Wave
Network

BLE
Beacon



KNX


Smart Building Software
(High Level Functionalities)
KNX
Network
Z-Wave
Network
BLE
Beacon

Group address

- Each KNX device has at least one group address
- Group address : x/y/z
  - x: type d'action (commande)
  - y: étage
  - z: numéro du bloc

➔ Actions (x)

- 0: valve monitoring
- 1: Blind monitoring (total closing/opening)
- 2: Do not use
- 3: Blind monitoring (partial closing/opening)
- 4: Reading blind state

KNX telegram

	Contrôle	Adresse expéditeur	Adresse destinataire	Compteur de routage	Longueur	Données	Sécurité
Bits	8	16	17	3	4	16 x 8 Maximum	8

- Actions (champ *Données* dans le telegram):
  - **0** : commande des valves. la donnée transmise est un entier (2 octets): 0 (0%) 255 (100%)
  - **1** : commande des stores. La donnée transmise est un bit (1 octet) : 0 (ouverture à 100%) ou 1 (fermeture à 100%).
  - **2** : à ne pas utiliser
  - **3** : commande des stores. La donnée transmise est un entier (2 octets) : 0 (ouverture à 100%) .... 255 (fermeture à 100%)
  - **4** : Lecture de l'état du store : 0 (ouverture à 100%) .... 255 (fermeture à 100%).

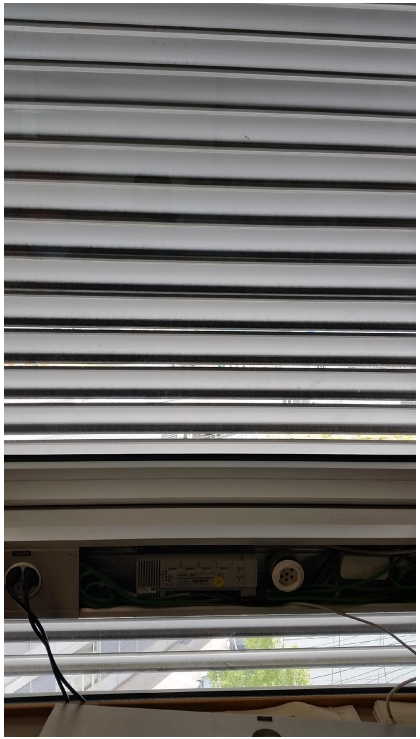
Blinds' control

	Data	Size	apci	Group address
Full open	0 (100% opened)	1	2	1/floor/bloc
Full close	1 (100% closed)	1	2	1/floor/bloc
Lecture	Not used. Put any value	1	0	4/floor/bloc
Open/close (partial)	[0 … 255] 0 : 100% opened 255 : 100% closed	2	2	3/floor/bloc

Valves' control

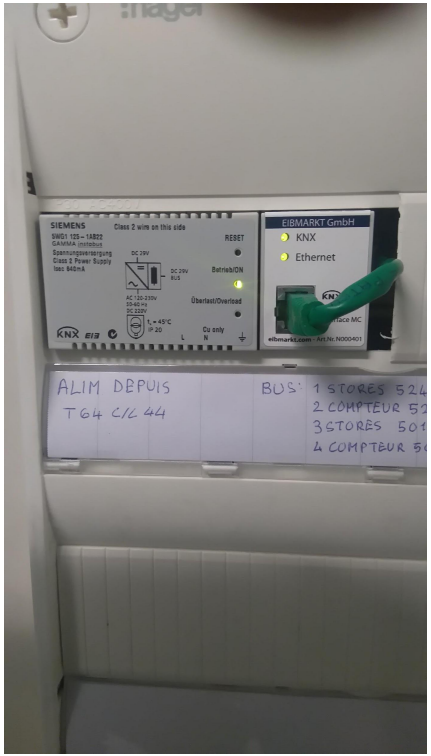
	Data	Size	apci	Group address
Control	[0 … 255] 0 : 100% closed 255 : 100% opened	2	2	0/floor/bloc
Lecture	Not used. Put any value	1	0	0/floor/bloc

Animeo KNX (Somfy)

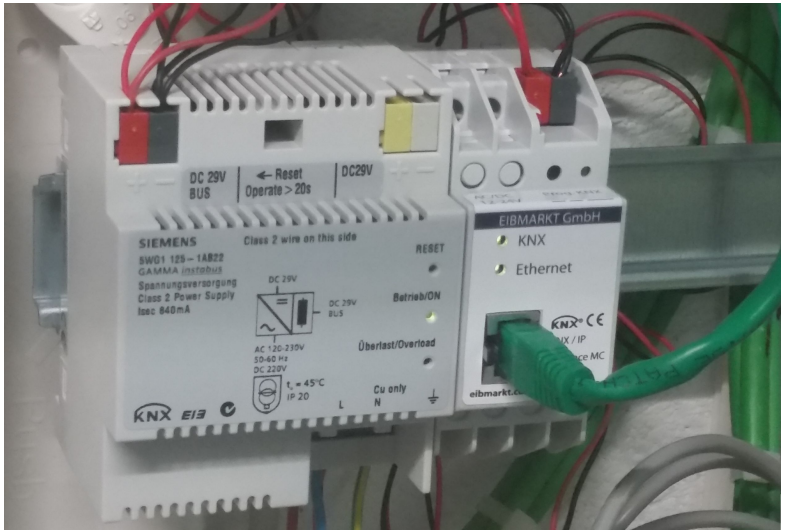


Servomoteur de vanne de radiateur KNX

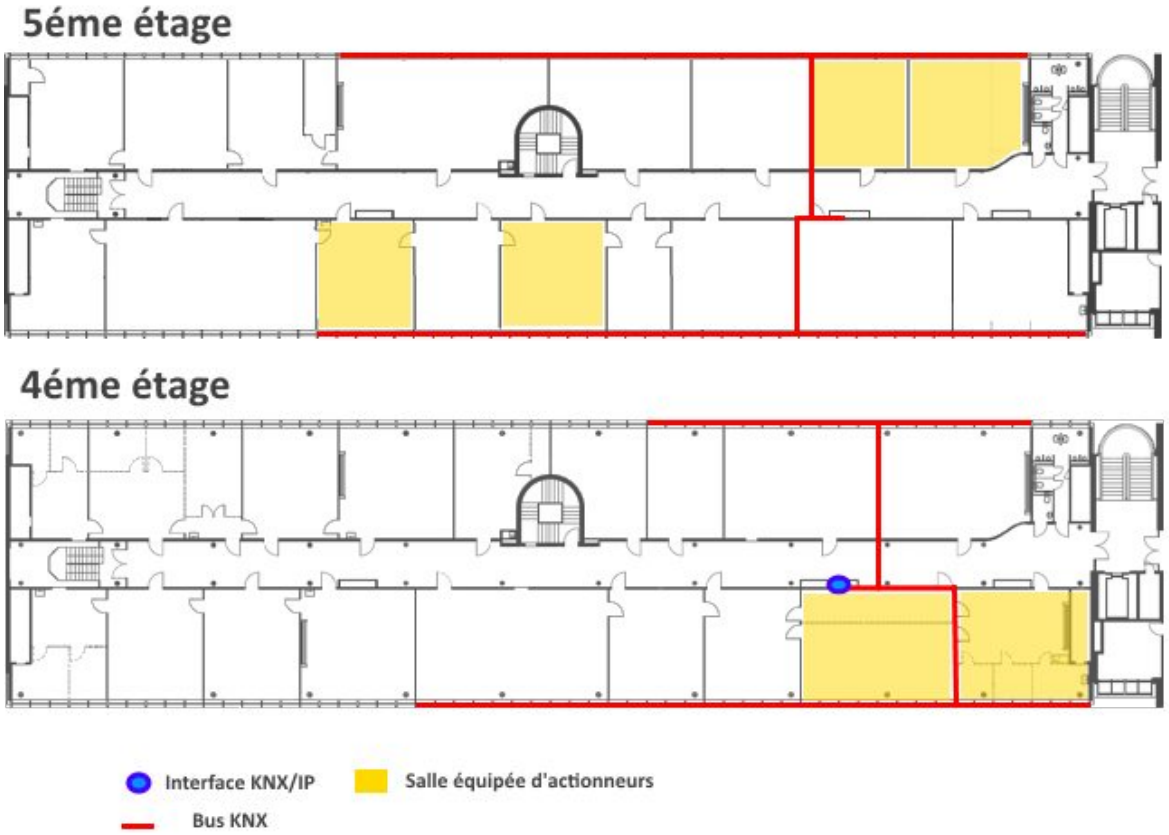
Passerelle KNX/IP



- Listening on Port : 3671



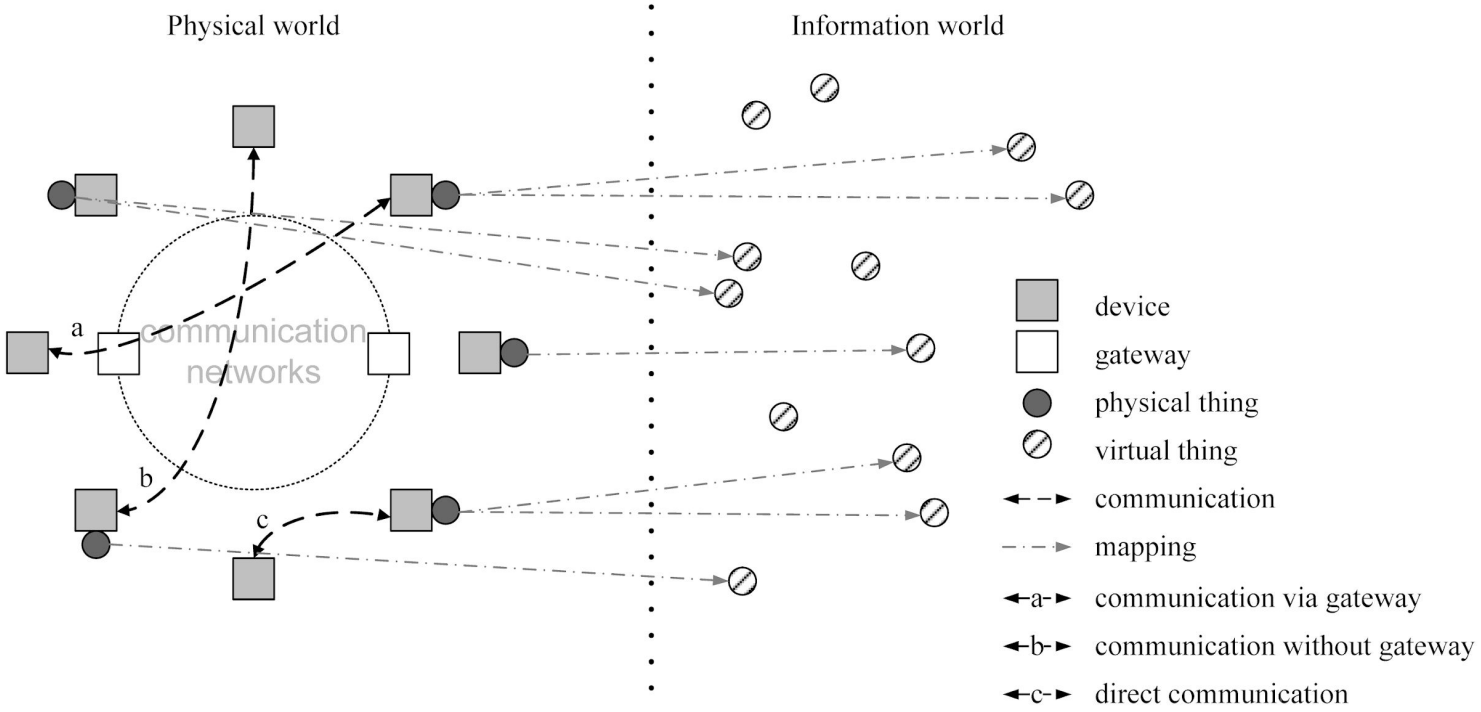
Smarthepia
KNX network



KNXnet / IP

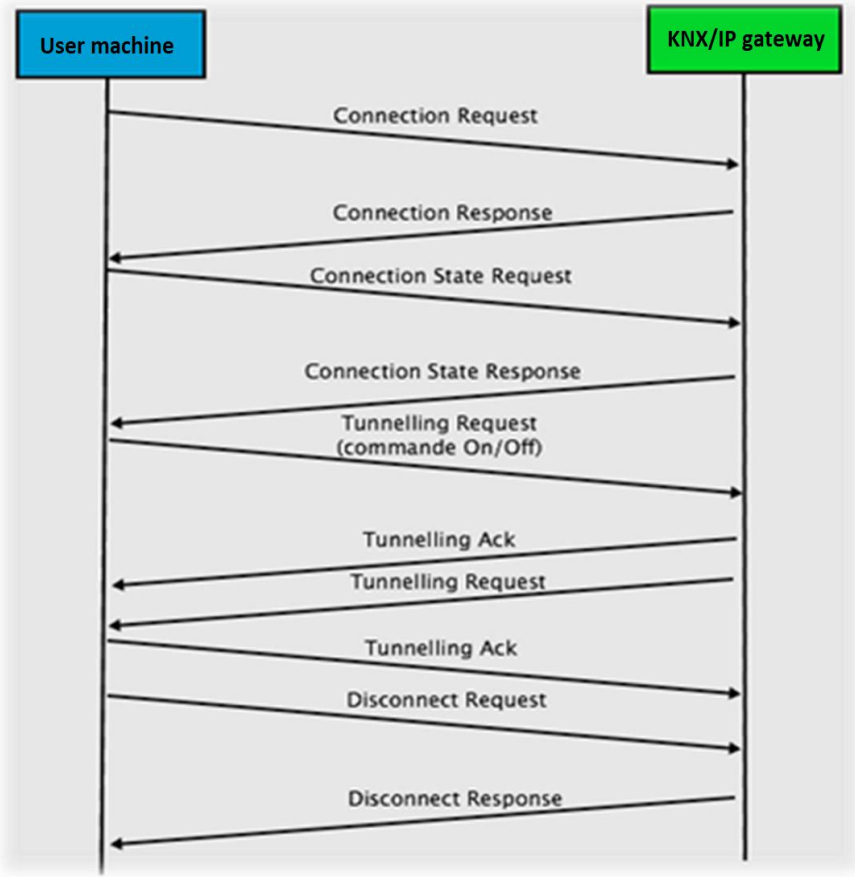
- ***knxnet/IP*** is a Protocol that allows users to bridge the gap between the real world (KNX network is our case) and the digital world (TCP/IP network and virtual objects).

Physical and virtual things



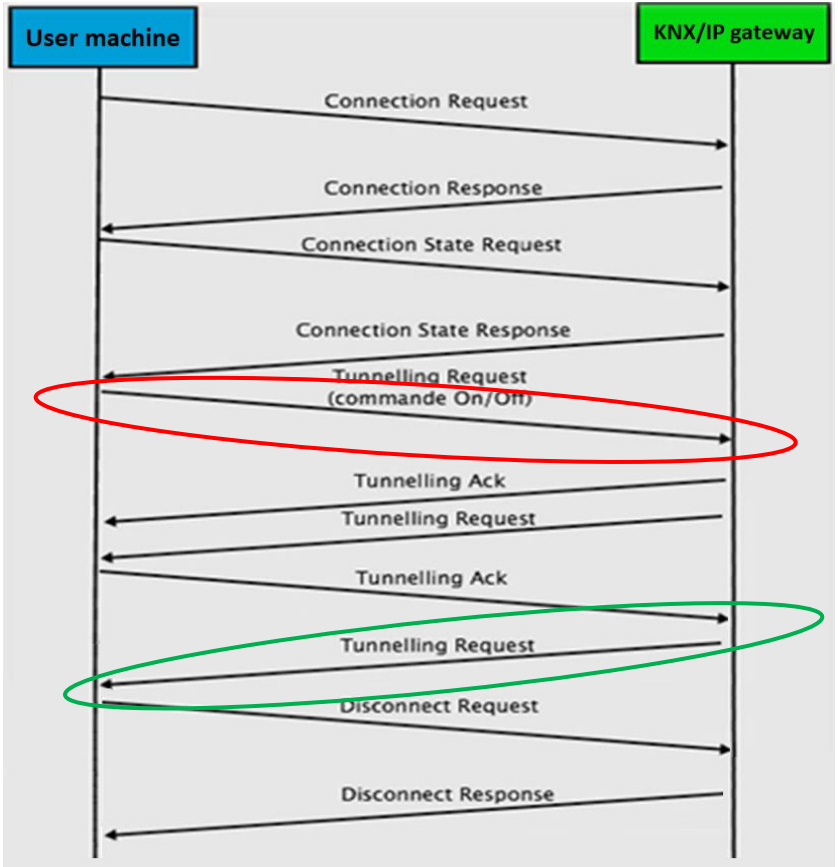
KNXnet / IP

KNXnet/IP
(protocol used for a "write" operation: sending command)



KNXnet / IP

KNXnet/IP
(protocol used for
a “read” operation:
retrieving data)



Read command (question)

Reply (answer): Device status

knxnet : Python API for KNXnet/IP

- knxnet is a Python3 library to create and decode KNXnet/IP datagram.
- Then you can send/receive the frames to/from a KNX/IP gateway with UDP.
- This library was developed by **Adrien Lescourt** within the HES-SO project: EMG4B.
- Today it is maintained by **Nizar Bouchedakh**.

actuasim simulator

- Listening on Port 3671 (like real gateway)