

系統專題研究-物聯網中介軟體設計 FINAL PROJECT

大樓智慧照明服務

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<以租代買>擁有

- 將照明變成一種服務
- 收費會比直接購買燈泡便宜
 - ▣ 顧客購買後，服務會一直用下去
 - ▣ 顧客不須管理與維護燈泡

實踐循環經濟3> 125年長青企業 飛利浦

不只賣燈泡還賣服務「以租代買」更循環

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出處：2016年10月號《遠見雜誌》《遠見雜誌》第364期 瀏覽數：34,850+



剛轉型的百年大廠飛利浦，積極加入循環經濟行列。除了回收，還推出「租借燈具」服務，造就了全新的商業模式。

字級：大小

System Target: Light Monitor

□ 大樓電燈智能監控

- ▣ 監控建築物內照明設備是否需要更換
- ▣ 通知維護廠商更換燈泡
- ▣ 隨時添加需要監控的照明
- ▣ 隨時擴展到不同的建築物



<https://www.youtube.com/watch?v=agpBh4ujGWA>

System Target: Light Control

- 結合智能照明的功能，節省照明
- 利用PIR sensor
 - ▣ 室內無人一段時間自動關燈
 - ▣ 少人時段公共區域自動減光，節約燈具消耗



Control Logic

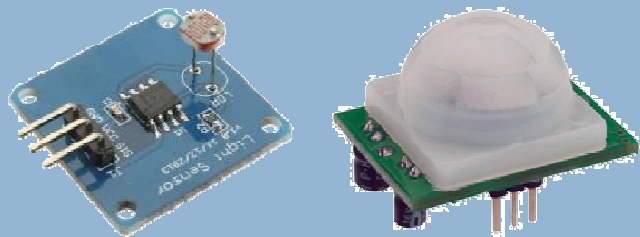
1. 按開關開燈，系統環境亮度設定適當的光度
2. Light Sensor 偵測燈光是否有正常運作，回報 server
3. PIR Sensor 偵測現場是否有人，適時關燈
4. Server 可對系統做各種設定Controller 依不同時間，調節光度
關燈

系統架構

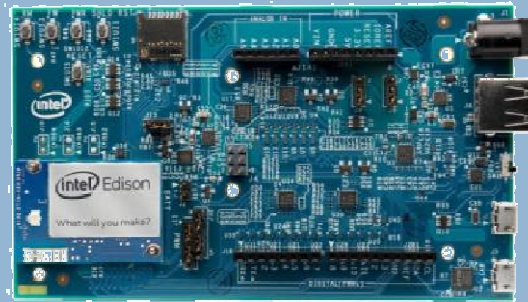
Database



Sensor



Controller

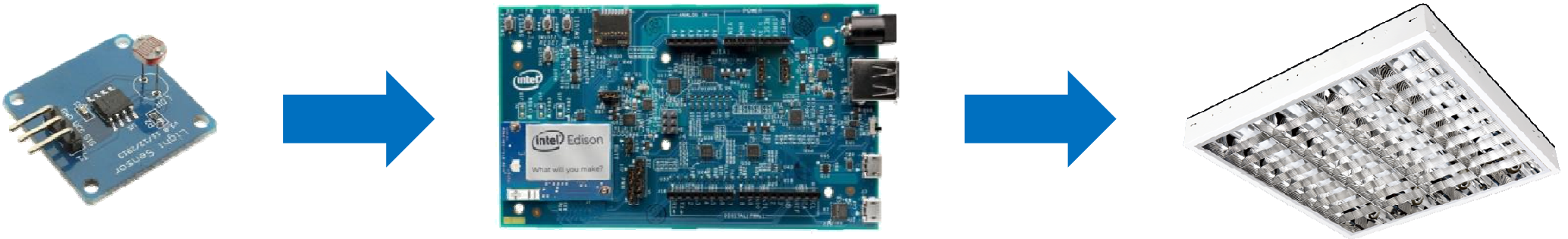


Light



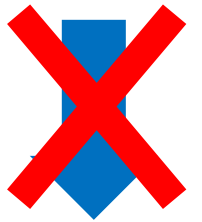
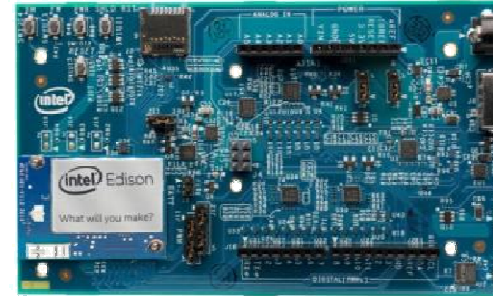
Light Sensors & Light

- Light Sensor and LED as light
- Running on Wudevice
- Sensor connect to controller using Z-WAVE, sending sensed light level and receiving control



Light Sensors

Zwave_fail.mp4



A general daemon

- User can set server address
- To upload:
 - ▣ Uploadtype, uploadvalue
 - ▣ Upon uploadvalue update, daemon send request to assigned server
- Data field related to download:
 - ▣ Server get download type, value, update to all listener

RESTDaemon R	
	serveradr
	deviceid
→	uploadtype
→	uploadvalue
	downloadtype
	downloadvalue
	refresh rate

Controller / Server

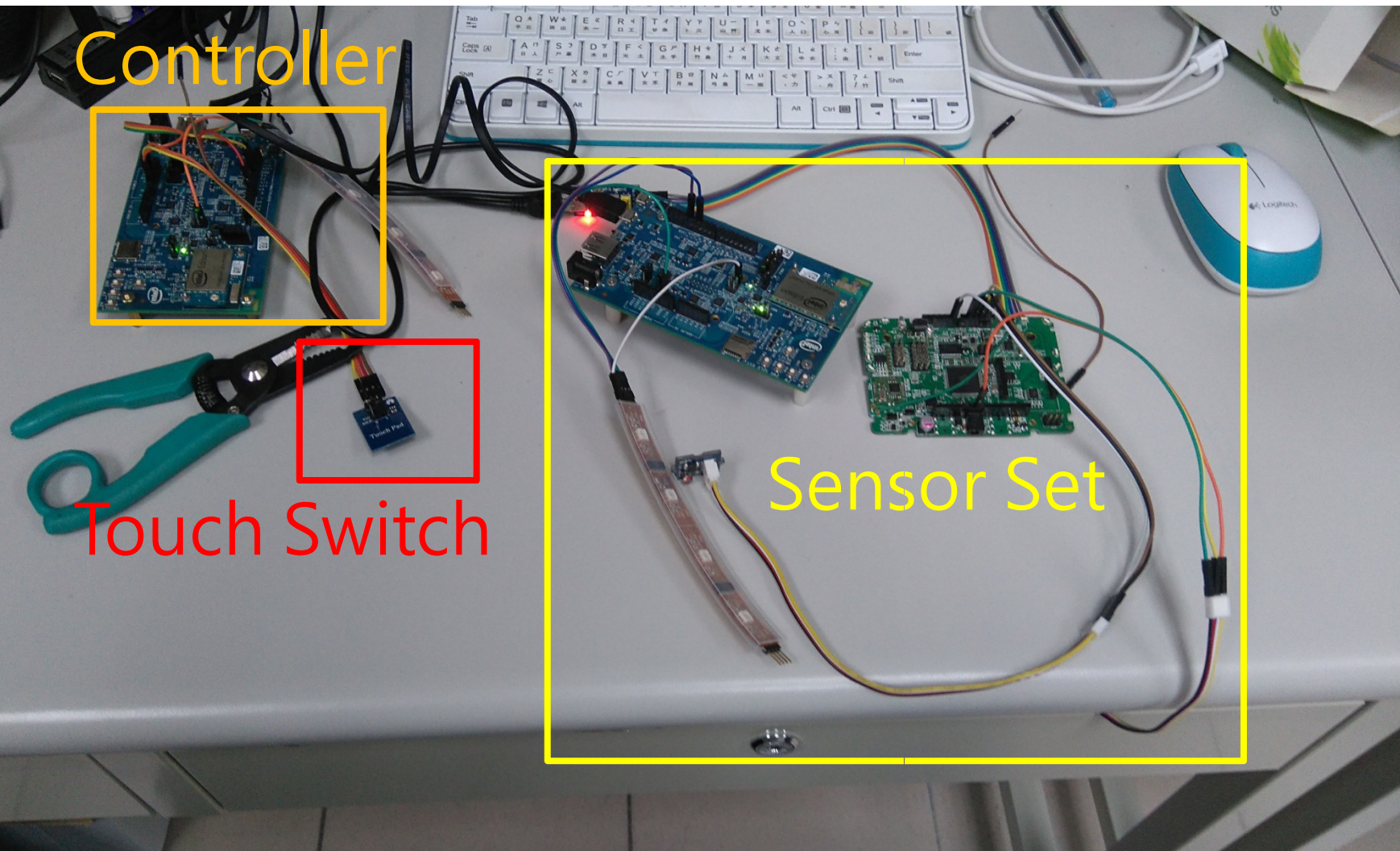
□ Controller:

- ▣ Collect Data from sensors,
- ▣ Implement all control logic

□ Server:

- ▣ Listen to upload data from controller
- ▣ According to dataID, extract datavalue and save to database (we implement in SQL)
- ▣ Send update command to controller

System Structure

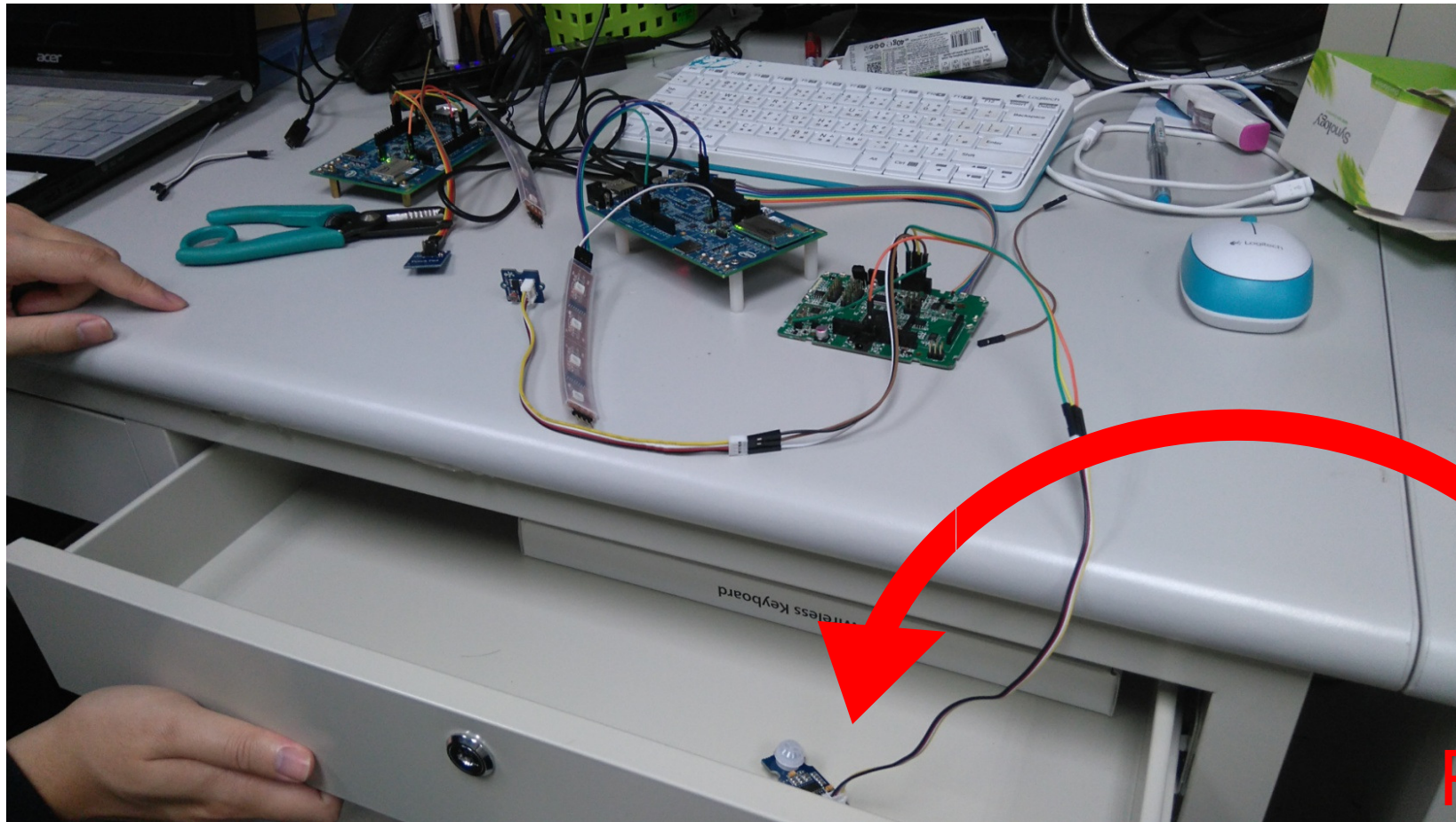


Sensor:
Pir sensor x1
Light sensor x1
LED x1
Wudevice x1
Edison x1

Controller:
LED x1
Touch pad x1
Edison x1
REST client x1

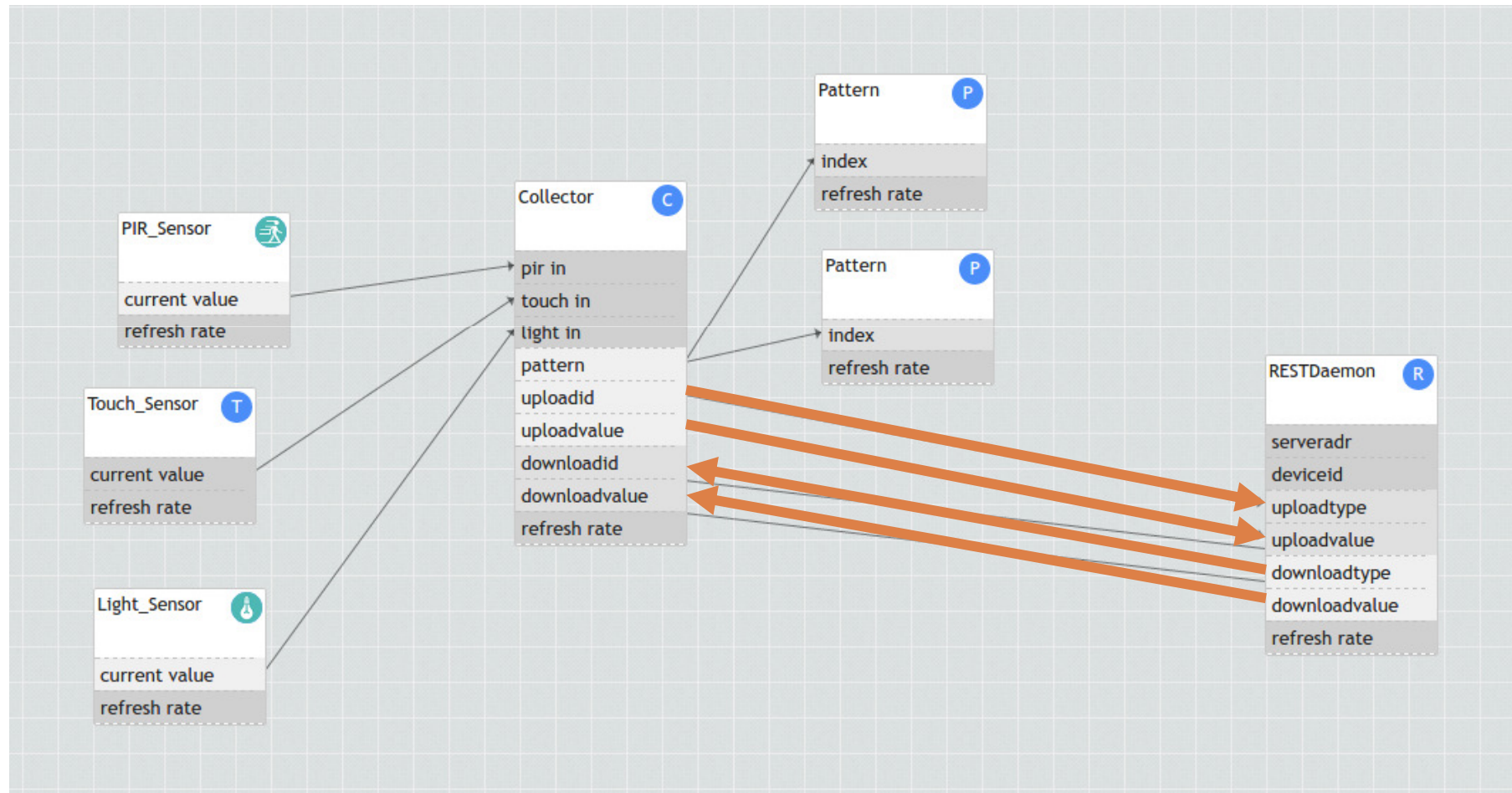
REST Server:
REST server x1

System Structure



PIR sensor
is here

FBP for One Area



Demo: Light Control

1. Adjust light with light sensor value

Lghtpattern_level.mp4

Demo: Light Control

1. Close light based on PIR sensor

Close_wo_pir.mp4

Close_wi_pir.mp4

Demo: Upload Server

- Upload data to server

severwork.mp4

Demo: Server Command

- Server can close light remotely, or set the time to close light without people in environment

Server_close_light.mp4

Server_set_time.mp4

Improvement to WuKong

- 能夠大量管理devices 的API或是介面
 - ▣ 自行連結新的devices，並即時deploy
 - ▣ 現有的介面並不適於大量 devices的管理
 - ▣ 諸如location 或各類資訊需要自動化的設定方式

Other Problems

```
<WuClass name="REST_Daemon" id="2040" virtual="false" type="hard">  
  <property name="pir_recv" access="readwrite" datatype="short" default="0"/>  
  <property name="lightsensor_recv" access="readwrite" datatype="short" default="false"/>  
  <property name="refresh_rate" access="readwrite" datatype="refresh_rate" default="100" />  
</WuClass>
```

Deploy Failed with very limited info:

File not found: .../wkdeploy.wkpf_linktable

Other Problems

Wukong signal is not reliable.

If we set a property to 1, and back to 0 quickly, the receiver will only get one update and get 0.