Internet of Things (IoT)

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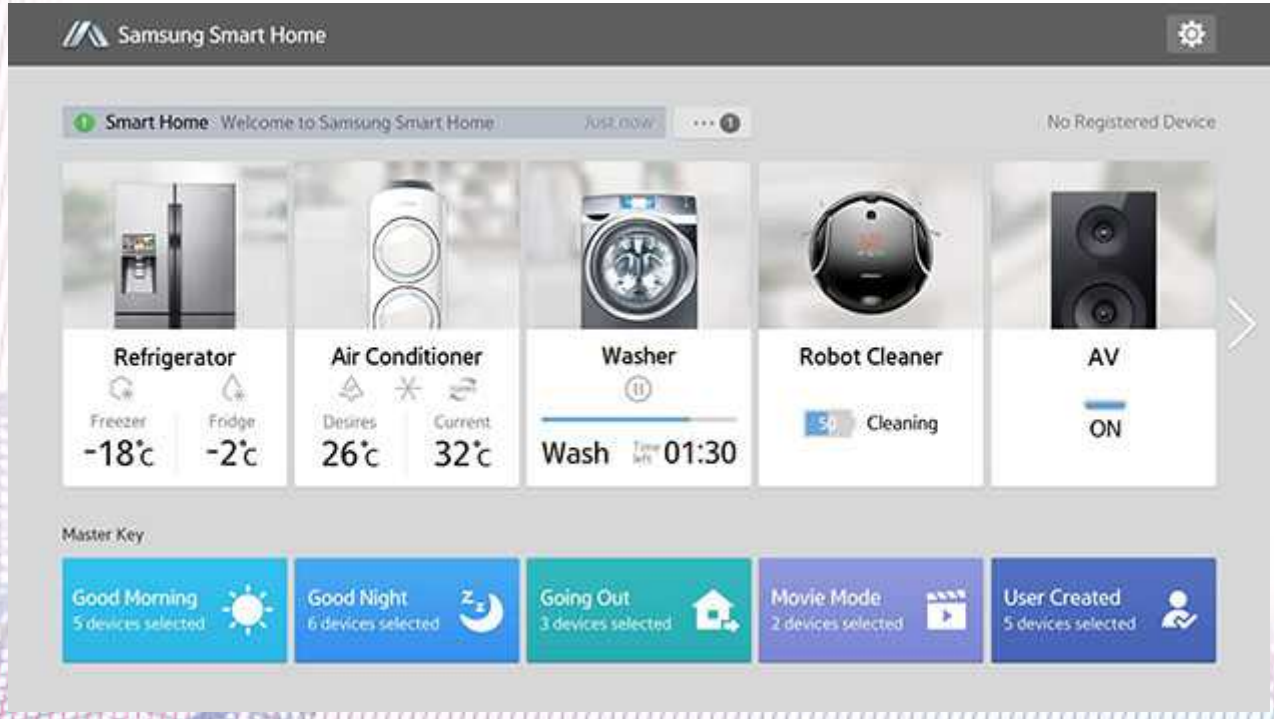
Smart Things - Samsung

- https://shop.smartthings.com/#!/kit
  #home-security-kits
  ~ US 389.00 $



Relay Module

- 1pcs Solid State Relay SSR-40DA 40A /250V 3-32VDC
  US $4.36
  http://www.ebay.com/itm/251154726090
- Arduino PIC AVR MCU DSP
  US $ 8.41
  http://ru.aliexpress.com/item/New-5V-8-Channel-Relay-Module-Boa
- Arduino NooLite sheld

Protocol NooLite

- http://habrahabr.ru/company/contactless/blog/229469/
- http://habrahabr.ru/company/contactless/blog/216023/
- http://habrahabr.ru/post/222663/

WAGO 222–412 or 222–413
Socket Strip from:
Wessen or Schneider Electric model W59

Cryptographic algorithm for NooLite

- **For NooLite possible use next code:**
  https://en.wikipedia.org/wiki/KeeLoq

- **Encryption:**

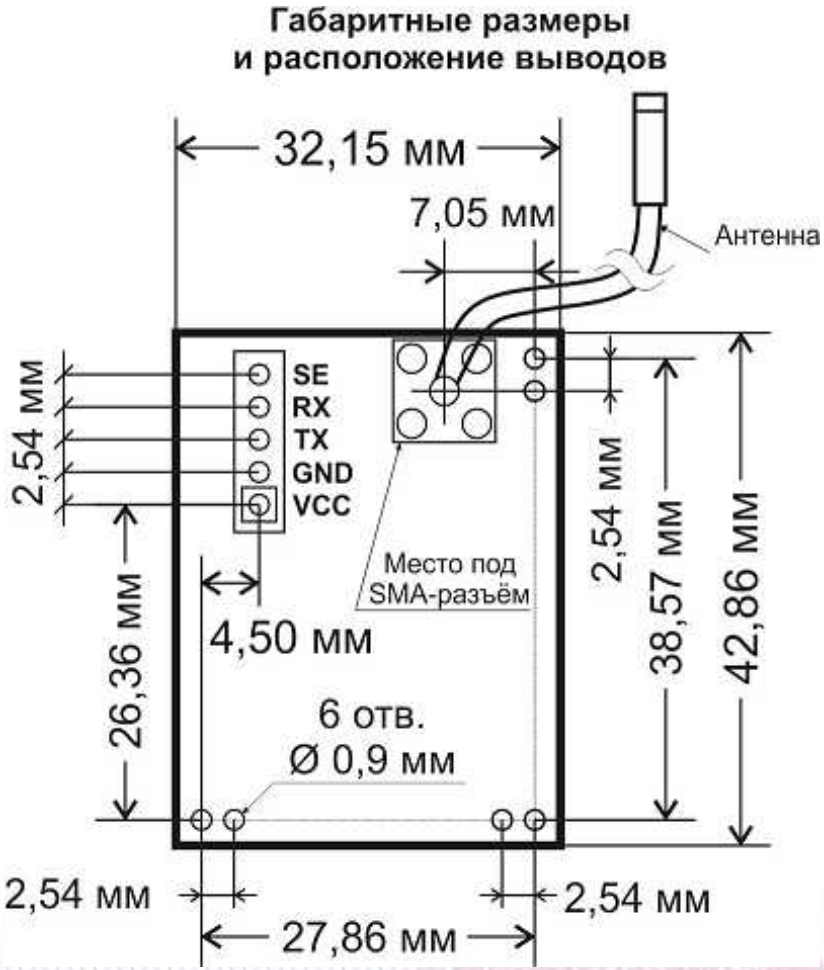
```
# define KeeLoq_NLF        0x3A5C742E
# define bit(x,n)          (((x)>>(n))&1)
# define g5(x,a,b,c,d,e)   (bit(x,a)+bit(x,b)*2+bit(x,c)*4+bit(x,d)*8+bit(x,e)*16)
u32 KeeLoq_Encrypt (const u32 data, const u64 key){
    u32    x = data, r;
    for (r = 0; r < 528; r++)
        x =
(x>>1)^((bit(x,0)^bit(x,16)^(u32)bit(key,r&63)^bit(KeeLoq_NLF,g5(x,1,9,20,26,31)))<<31);
    return x;
}
```

- **Decoding:**

```
u32 KeeLoq_Decrypt (const u32 data, const u64 key){
    u32    x = data, r;
    for (r = 0; r < 528; r++)
        x = (x<<1)^bit(x,31)^bit(x,15)^(u32)bit(key,(15-r)&63)^bit(KeeLoq_NLF,g5(x,0,8,19,25,30));
    return x;
}
```

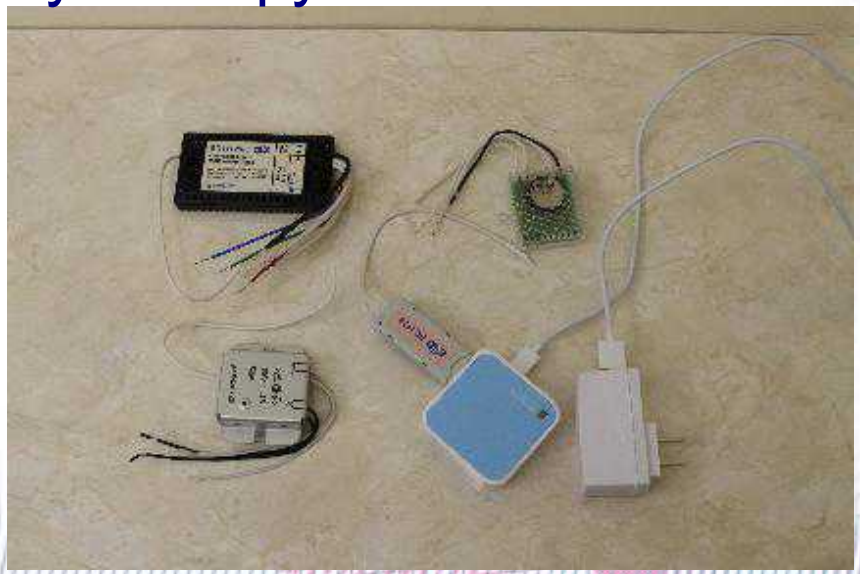
Arduino NooLite MT1132

- **US 17,8 $** - http://www.noo.com.by/modul_mt1132.html



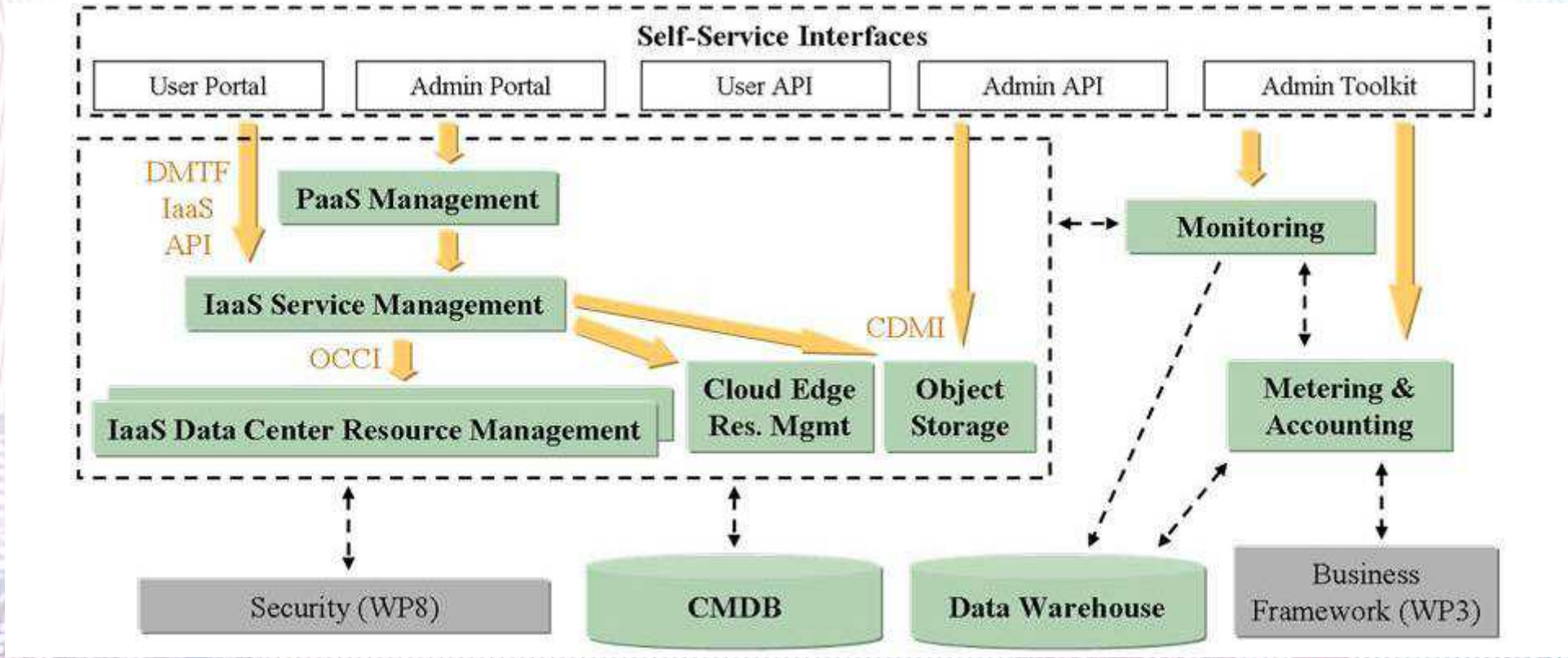
For demonstration need Sensors

- **Transmitters**
  Three light switch mounted in the junction box - **20,8 $**
  RGB light switch - **20,8 $**
  USB transmitter fot TP-Link - **66$**
  http://www.noo.com.by/adapter-dlya-pk-pc1132.html
- **Receiver**
  USB reciever for TP-link – **45$**
  http://www.noo.com.by/adapter-dlya-kompyutera-rx1164.html
- **Dimmers**
  500 Wt – **23,9$**
  RGB controller. - **37,3$**



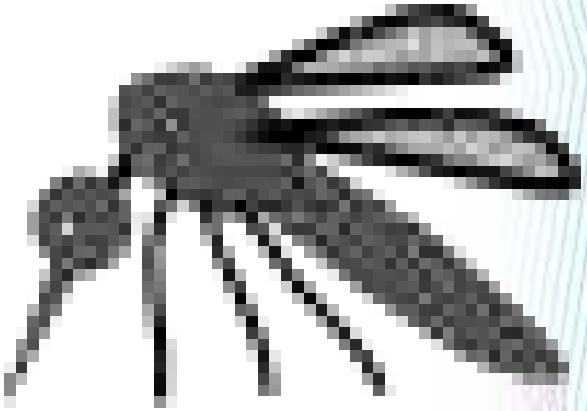
FI-WARE

- Free Virtual Server with free IP
  https://cloud.lab.fi-ware.org/
- Free Domain Name in 2 hours
  http://dot.tk



Mosquitto is MQTT-broker

- **MQTT(s) subscribe/publish**
  http://mosquitto.org/
- apt-get install mosquitto mosquitto-clients python-mosquitto libmosquitto0
- /etc/init.d/mosquitto restart
- **Arduino**
  http://knolleary.net/arduino-client-for-mqtt/
- **Android**
  https://play.google.com/store/apps/details?id=at.tripwire.mqtt.client
- **Java MQTT Rest**
  http://forkbomb-blog.de/2014/bringing-mqtt-authentication-and-rest-t
- **Python - NooLile**
  https://github.com/ignat99/mosquitto



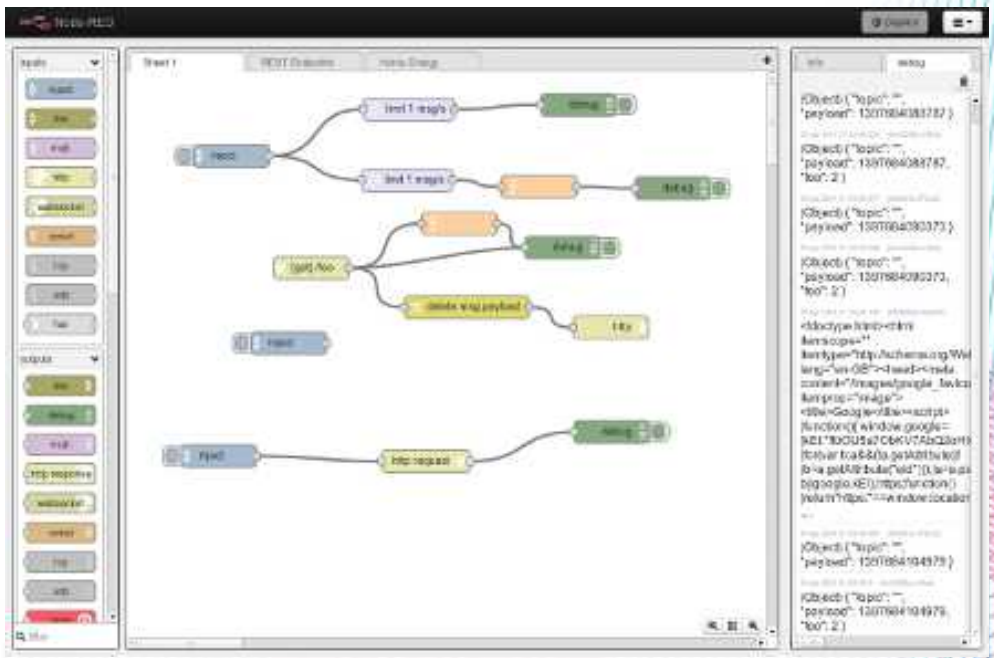
Node.JS

adduser <name_for_mqtt_agent>
su – <name_for_mqtt_agent>
mkdir -p ~/.nodes && cd ~/.nodes
curl -O \
http://nodejs.org/dist/v0.10.12/node-v0.10.12-linux-x64.tar.gz

tar -xzf node-v0.10.12-linux-x64.tar.gz
mv node-v0.10.12-linux-x64 0.10.12
ln -s 0.10.12 current
export PATH="~/.nodes/current/bin:$PATH"
rm ~/.nodes/node-v0.10.12-linux-x64.tar.gz
node –version
npm install express

Node Red by Node.js

- Node-red
  http://nodered.org/
- git clone https://github.com/node-red/node-red.git
  cd node-red/
  npm install
  node red.js
  curl http://127.0.0.1:1880/
- Problem with http://heroku.com
- nano settings.js
- nano /etc/init.d/node-red



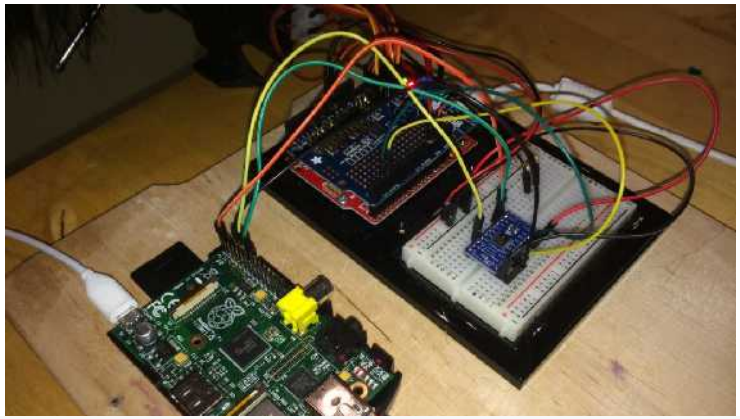
Extra nodes(STOMP,XMMP,..)

- https://github.com/node-red/node-red-nodes

- That is solution with **NooLite in 3 time cheaper** than Samsung Smart Things or Z-wave or KNX, etc.

Arduino and Minecraft

- http://walterhiggins.net/blog/Arduino-Minecraft
- https://github.com/walterhiggins/ScriptCraft
- https://github.com/walterhiggins/scriptcraft-extras-mqtt/tree/master/s
- http://blogg.bouvet.no/2014/03/10/an-internet-of-things-demo-using-



```
+---------+    +---------------+   +-----------+    +-----------------------------+
| Arduino | => | mosquitto_pub |=> | mosquitto | => | scriptcraft => craftbukkit |
+---------+    +---------------+   +-----------+    +-----------------------------+
          (serial)              (mqtt)          (mqtt)
```