SECURED Wireless CAMERA & Access POINT

Wireless Camera & Access POINT

Pain Points

- Secured surveillance camera accessible from Internet
- Secured Access Point for Wifi devices

Market

- Internet/Telekom Operators
- Security companies
- Transport/Constructions companies

Links

Github - Access POINT

USB Camera

Project stage

Product: READY!

Wireless Camera & Access POINT

1. Problem
2. Solution
3. Market
4. Benefits
5. Specifications

1. Wireless Camera & Access POINT

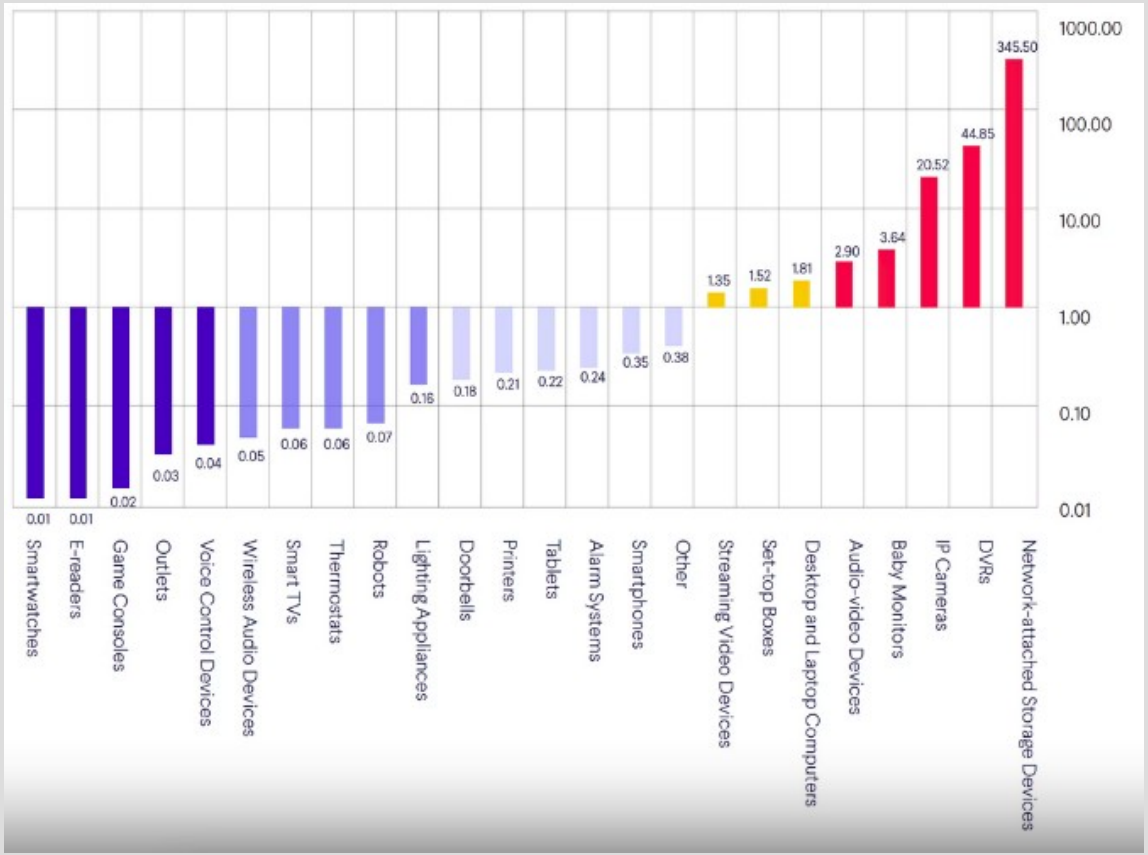
Problem

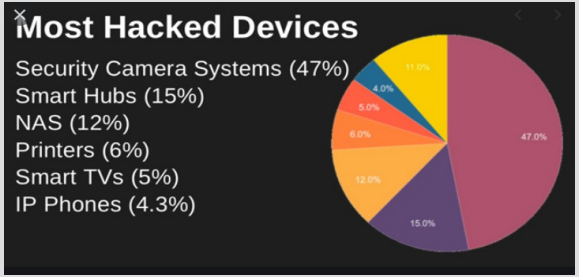
“An average IP camera is attacked over 20 times more often than an average device. Of the top 30 most attacked IoT device models, all are made by different manufacturers, however, just 4 brands are targeted by more than 96% of attacks.

IP cameras are infamous for having poor security. They are being hacked not only to spy on people, but also to participate in coordinated DDoS attacks.

Infected IP cameras also often become part of botnets. Many IP cameras have poor configurations, such as publicly known hard-coded administrator credentials, which make them easy targets for brute-force attacks. Since, like NAS devices, IP cameras are accessed remotely by their users, they are often exposed to the Internet. Like DVRs, many IP cameras autoconfigure the home router via UPnP to open ports to the Internet.”

1. Wireless Camera & Access POINT





2. Wireless Camera & Access POINT

Solution?

A camera accessible only to owner, without any cloud, account, app etc.

NO Java

NO App

NO drivers

NO Account

NO Cloud

2. Wireless Camera & Access POINT

VISION?

2. Wireless Camera & Access POINT

Internet

server.domain.com:80XY

LTE Radio

SSH Tunnel,
OpenSSL 3.3.1

LTE Modem

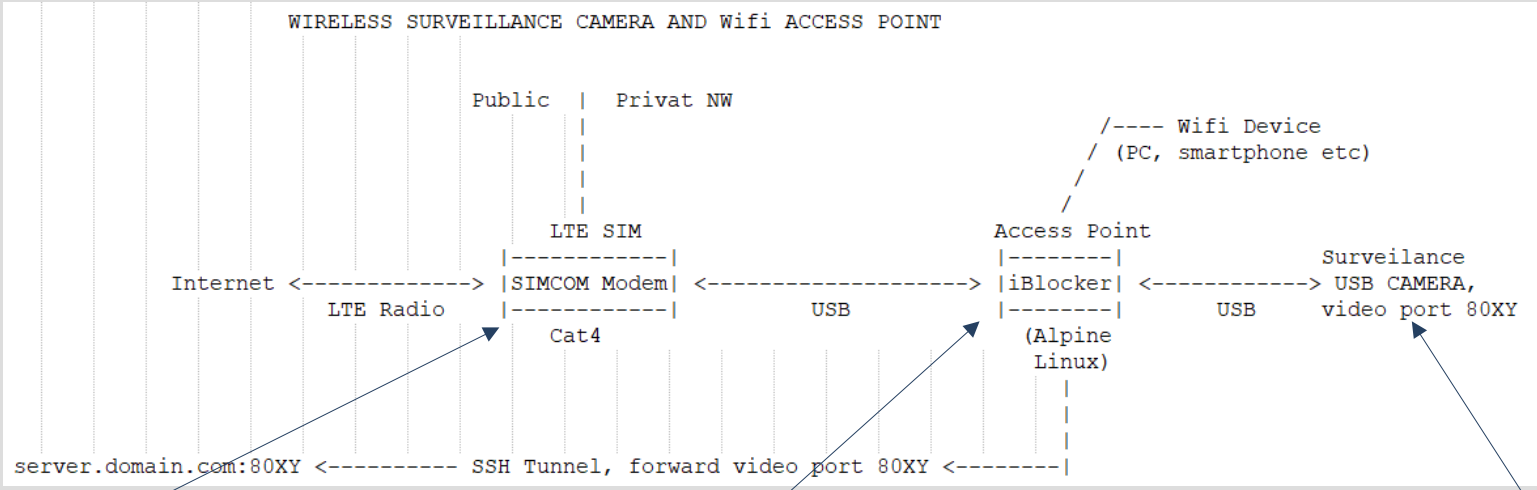
USB

iBlocker (Alpine Linux, kernel 6.6.41)

USB/IP
Camera

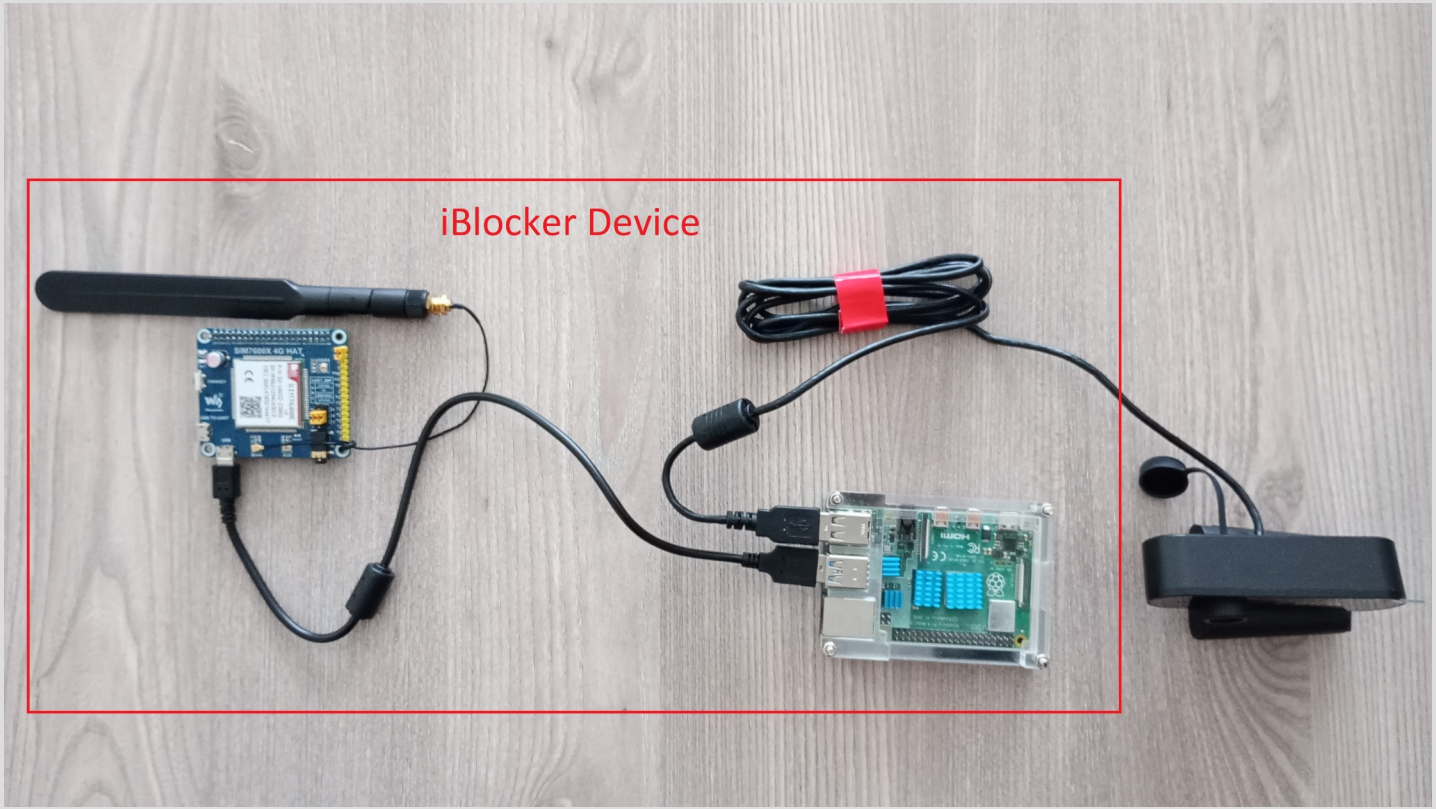
USB Camera, port 80XY

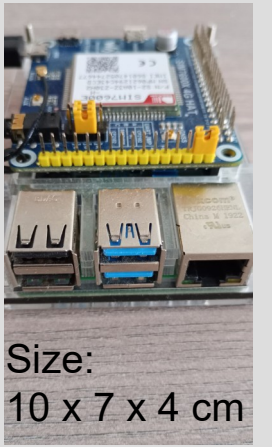
2. Wireless Camera & Access POINT



2. Wireless Camera & Access POINT

iBlocker Device





Size:
10 x 7 x 4 cm

2. Wireless Camera & Access POINT

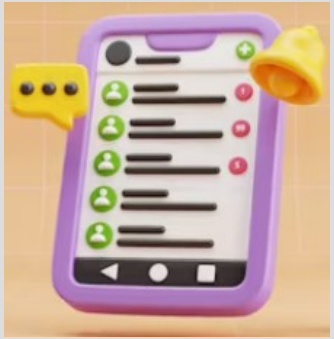
Advantage

- Modular design: only modem, camera or iBlocker could be swapped when needed

- Any LTE modem supported and any USB camera

Video activated by movement

Live video on server.domain.com:80XY



SMS commands implemented for creating/ destroying SSH tunnels, hardware reboot, poweroff etc

3. Wireless Camera & Access POINT

MARKET

Product could be installed everywhere: highways, ski resorts, buses, trains, construction sites etc

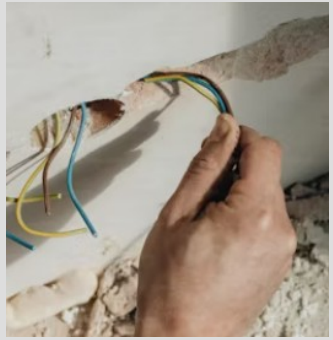




Alpine Linux is configured as an Access Point, so the LTE connection could be shared with multiple Wifi devices

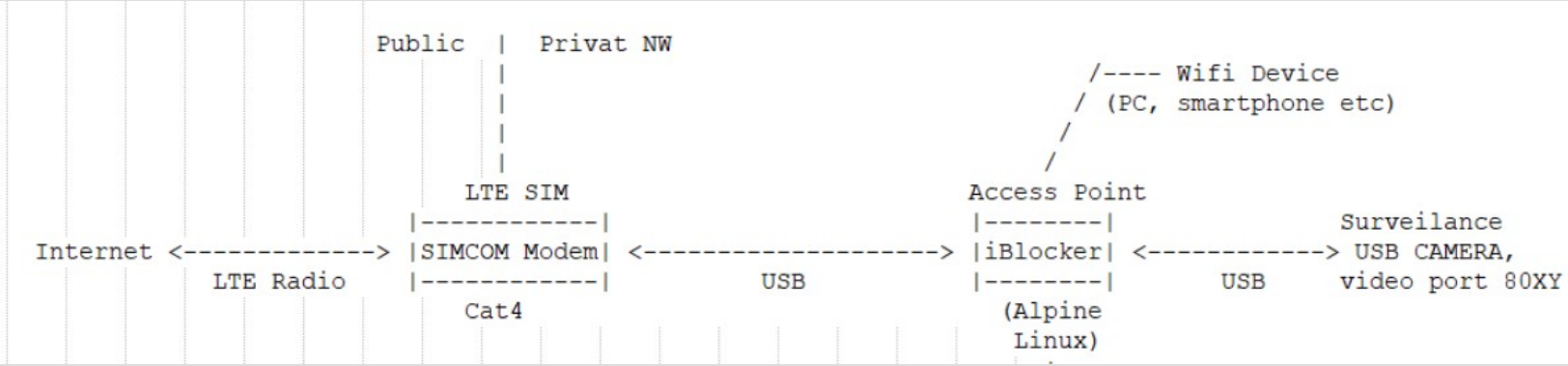
Ideal for SmartCity

Fast Installation and Commissioning



3. Wireless Camera & Access POINT

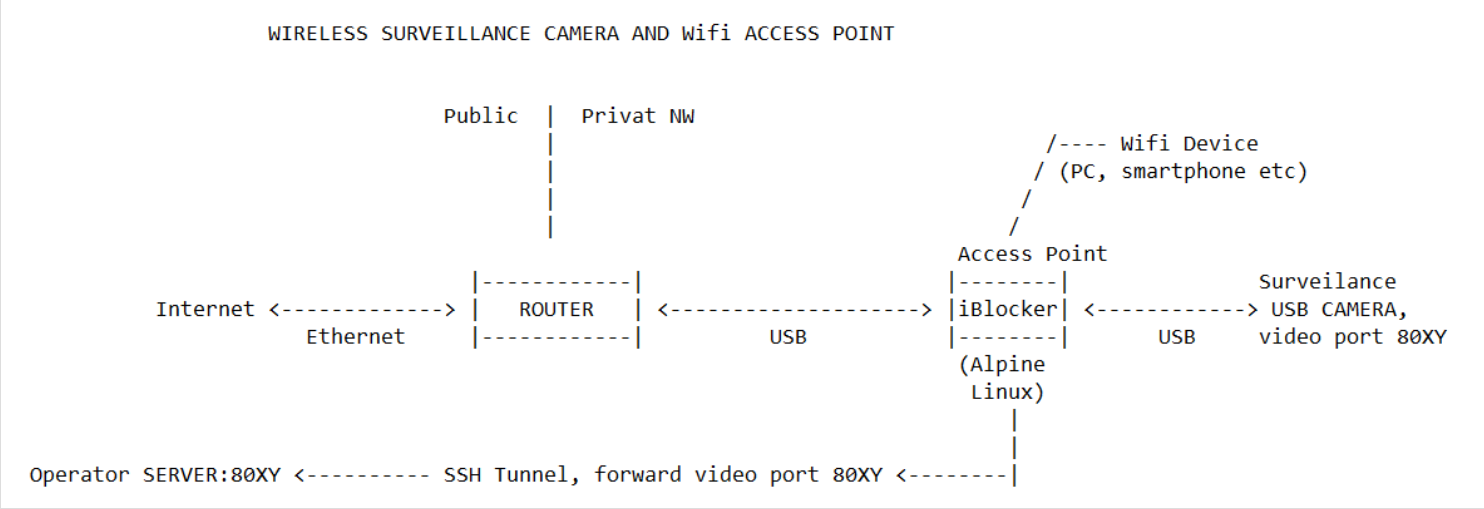
Business Case 1: SmartCity – Access Points installed in every location where LTE is available



Low energy consumption – could be powered by solar panels
Low price for HW
iBlocker installation is easy & fast
iBlocker Device accessible via Wifi
No need to swap the entire system in case of HW issues

3. Wireless Camera & Access POINT

Business Case 2: USB* camera accessible from everywhere**



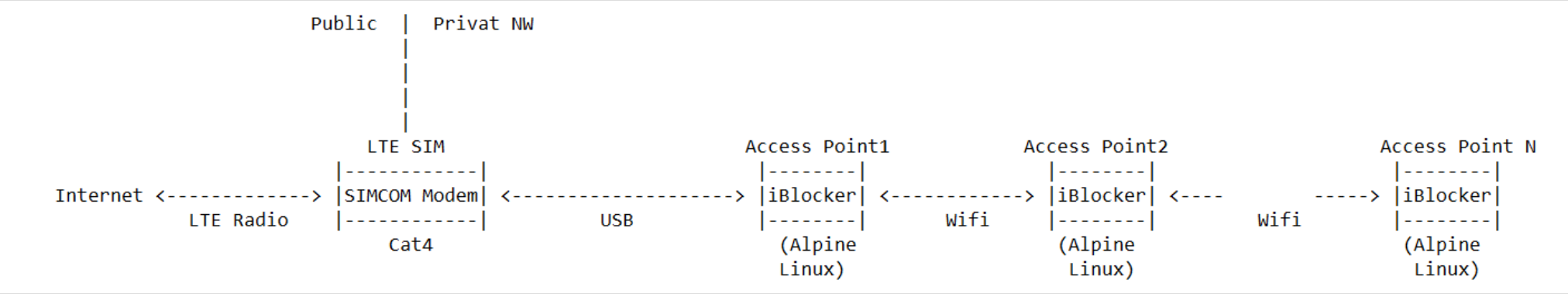
User will use the operator server to access his camera from Internet
Operator could charge the usage of Server. No need to maintain Cloud or User Accounts
Operator could sale the iBlocker device and the installation (one time payment)

*** every USB camera could be accessed from Internet. User does not need to buy another camera**
**** possible to use also an IP Camera**

3. Wireless Camera & Access POINT

Business Case 3: “Keller” Internet

IEEE 802.11ac standard, known as Wi-Fi 5: indoor ranges extending up to 70 meters and outdoor ranges reaching up to 200 meters.



The iBlocker 1 could be setup as a repeater for iBlocker2 which could be a repeater for ... iBlocker N

Then Internet would be available in places as tunnels or low level garages - > advantageous for electric cars owners.

4. Wireless Camera & Access POINT

Benefit 1 → Security

Video records available only to the owner

Security offered by:

Telecom Operator

Domain server (or private server)

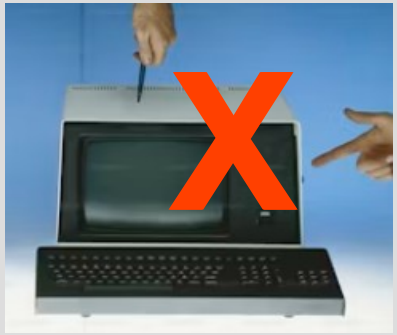
SSH tunnels and SSH certificates

Private DNS

Firewall

VPN

NO Java

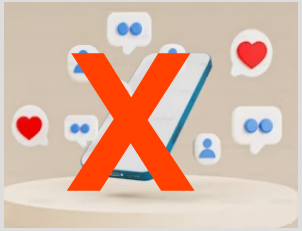


NO drivers

NO app

NO additonal costs

NO cloud



NO account needed

NO optical fiber

4. Wireless Camera & Access POINT

Benefit 2

Supports every USB camera
→ User should not buy a new expensive camera

Low power consumption :

Idle	540 mA (2.7 W)
`ab -n 100 -c 10` (uncached)	1010 mA (5.1 W)
400% CPU load (`stress --cpu 4`)	1280 mA (6.4 W)

→ Solar Panels could be used

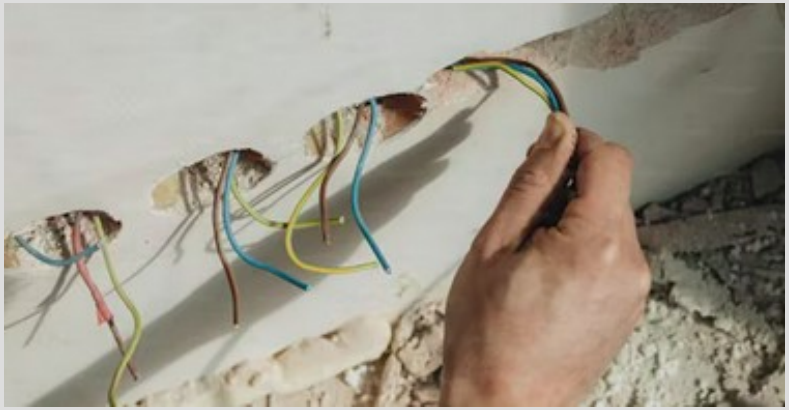
4. Wireless Camera & Access POINT

Benefit 3

Easy to install

- via script - less than 3 minutes

- via images – less than 3 minutes



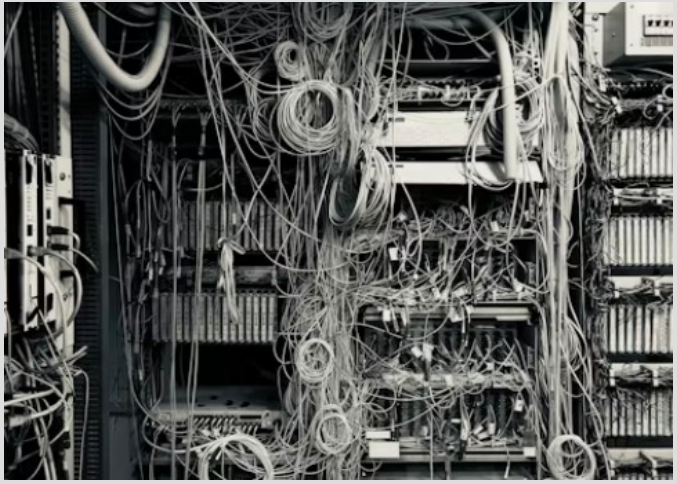
Modular Design (Hot Swap)

- easy to replace a defective part

4. Wireless Camera & Access POINT

Benefit 4

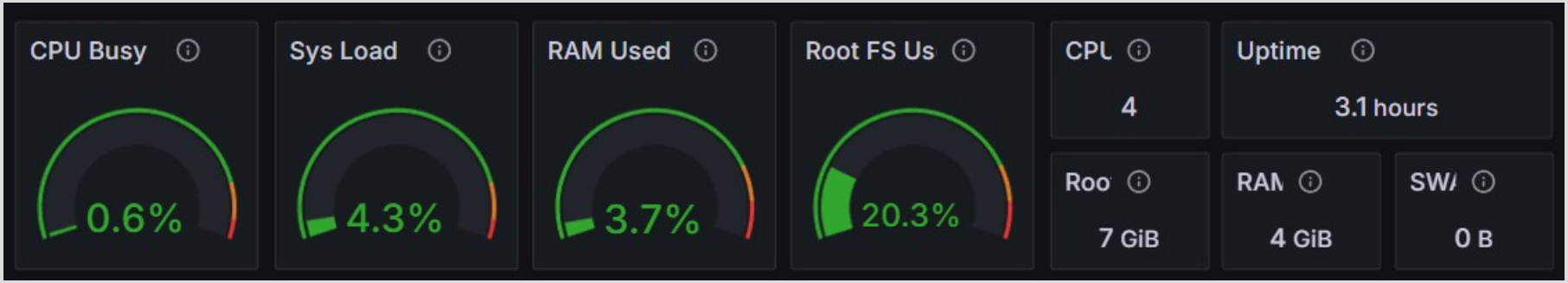
Live streaming via SSH Tunnel

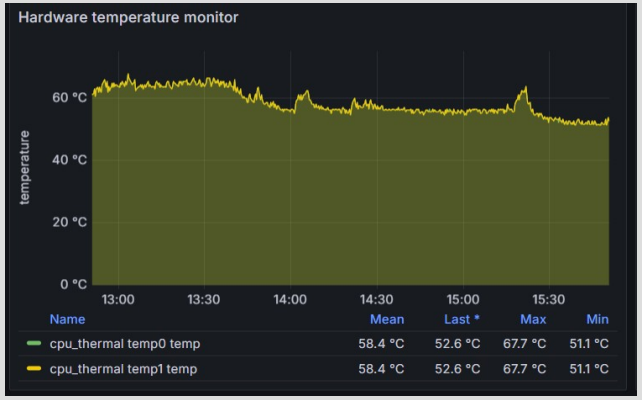


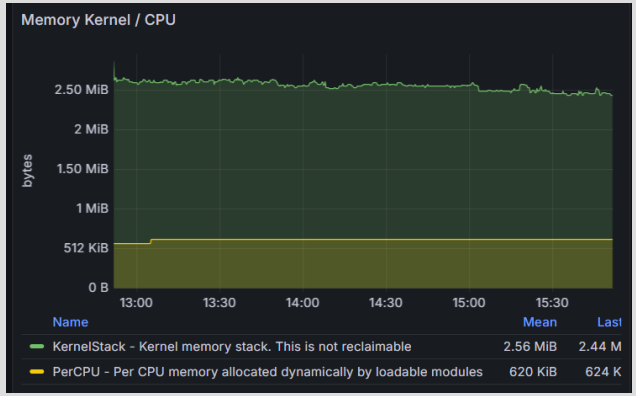
Video records are PRIVATE

4. Wireless Camera & Access POINT

Benefit 5 - Easy to monitor







Notifications available via email

5. Wireless Camera & Access POINT

Modem SPECS

Product	SIM7600CE-CNSE	SIM7600CE-T	SIM7600E	SIM7600E-H*	SIM7600A-H*	SIM7600G-H
Working frequency						
LTE Cat-4 /LTE Cat-1	**LTE-TDD** B38/B39/B40/B41 **LTE-FDD** B1/B3/B5/B8		**LTE-FDD** B1/B3/B5/B7/B8/B20 **LTE-TDD** B38/B40/B41		**LTE-FDD** B2/B4/B12	**LTE-TDD** B34/B38/B39/B40/B41 **LTE-FDD:** B1/B2/B3/B4/B5/B7 /B8/B12/B13/B18/B19 /B20/B25/B26/B28/B66
3G	**UMTS/HSDPA/HSPA+** B1/B8 **TD-SCDMA** B34/B39		**UMTS/HSPA+** B1/B5/B8		**UMTS/HSPA+** B2/B5	**UMTS/HSDPA/HSPA+** B1/B2/B4/B5/B6/B8/B19
2G	**GSM/GPRS/EDGE** 900/1800 MHz				not support	**GSM/GPRS/EDGE** 850/900/1800/1900MHz
GNSS	not support	GPS/Beidou/GLONASS/GALILEO/QZSS				
Data transmission						
LTE Cat-4	150Mbps(DL)/50Mbps(UL)		not support	150Mbps(DL)/50Mbps(UL)		
LTE Cat-1	not support		10Mbps(DL) /5Mbps(UL)	not support		
3G (HSPA+)	42Mbps(DL)/5.76Mbps(UL)					
2G (EDGE)	236.8Kbps(DL)/236.8Kbps(UL)				not support	236.8Kbps(DL)/236.8Kbps(UL)
2G (GPRS)	85.6Kbps(DL)/85.6Kbps(UL)				not support	85.6Kbps(DL)/85.6Kbps(UL)

5. Wireless Camera & Access POINT

Modem SPECS

Software features				
Network Protocol	TCP/IP/IPV4/IPV6/Multi-PDP/FTP/FTPS/HTTP/HTTPS/DNS			
Internet access	PPP/NDIS/RNDIS			
USB Driver	Windows XP/7/8/10、Linux (RPi Raspbian System driver free)			
Hardware Interface				
SIM Card Slot	Both are supported, compatible with 1.8V and 3V SIM cards			
UART Interface	Both are supported, the serial port sends and receives AT commands, and is compatible with 3.3V/5V working level			
USB Interface	Both are supported and can be used to test AT commands, obtain GPS positioning information, upgrade firmware, etc.			
USB to UART	Both are supported and can be used for serial port debugging or logging in to Raspberry Pi			
Audio Port	Both are supported and can be used for voice operations such as making calls			
TF Card Slot	Support, can be used to store files, text messages and other data		Not Support	Support
Antenna interface	LTE main antenna	LTE Main Antenna + LTE Diversity Antenna + GNSS Antenna		

5. Wireless Camera & Access POINT

iBlocker SPECS

Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.8GHz
1GB, 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (depending on model)
2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
Gigabit Ethernet
2 USB 3.0 ports; 2 USB 2.0 ports.
Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)
2 × micro-HDMI® ports (up to 4kp60 supported)
2-lane MIPI DSI display port
2-lane MIPI CSI camera port
4-pole stereo audio and composite video port
H.265 (4kp60 decode), H264 (1080p60 decode, 1080p30 encode)
OpenGL ES 3.1, Vulkan 1.0
Micro-SD card slot for loading operating system and data storage
5V DC via USB-C connector (minimum 3A*)
5V DC via GPIO header (minimum 3A*)
Power over Ethernet (PoE) enabled (requires separate PoE HAT)
Operating temperature: 0 – 50 degrees C ambient

5. Wireless Camera & Access POINT

Awall Firewall available

```
iblocker9085:/etc/awall/optional# awall list
apache      enabled  Allow incoming Apache HTTP/HTTPS (TCP/80 and 443) ports
iBlocker    enabled  Default awall policy to protect iBlocker
monitoring  enabled  Monitoring via Prometheus/Grafana/node_exporter (port 9100)
motion      enabled  Motion locall accessible (port 8100)
ping        enabled  Allow ping-pong
ssh         enabled  Allow incoming SSH access (TCP/22)
```

iptables v1.8.10 (nf_tables)
ipset version v7.21

IP

:INPUT DROP [0:0]

:FORWARD DROP [0:0]

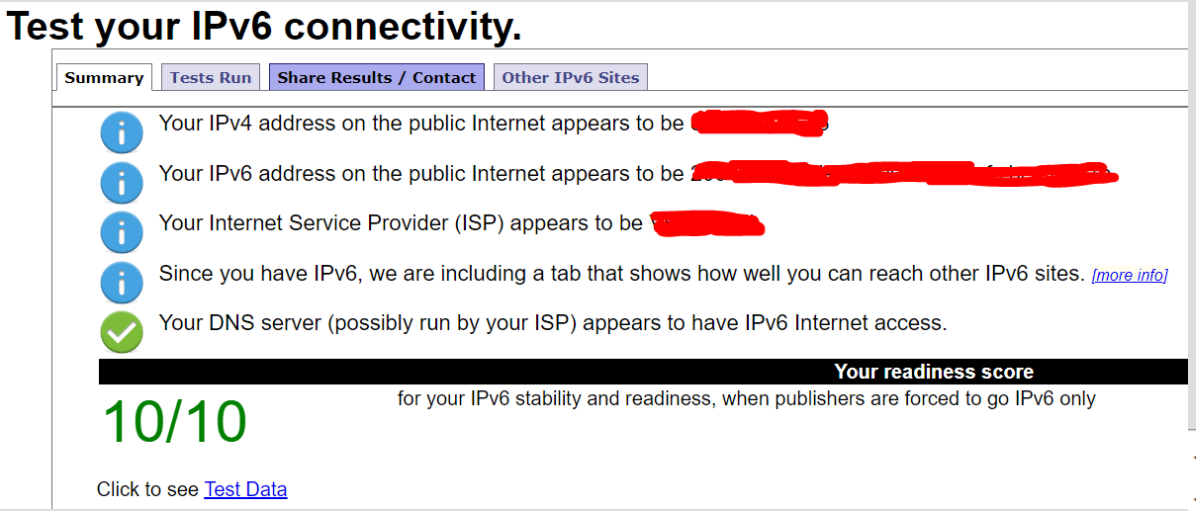
:OUTPUT DROP [0:0]

Access allowed only to declared IP ranges:

```
{
    "in": "LAN",
    "out": "_fw",
    "service": "ssh",
    "action": "accept",
    "src": [ "192.168.178.0/24", "172.25.1.0/24" ],
    "conn-limit": { "count": 3, "interval": 60 }
}
```

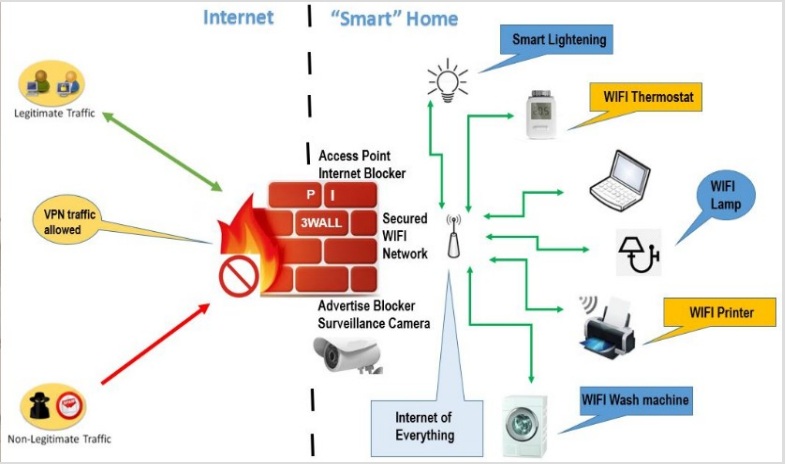
5. Wireless Camera & Access POINT

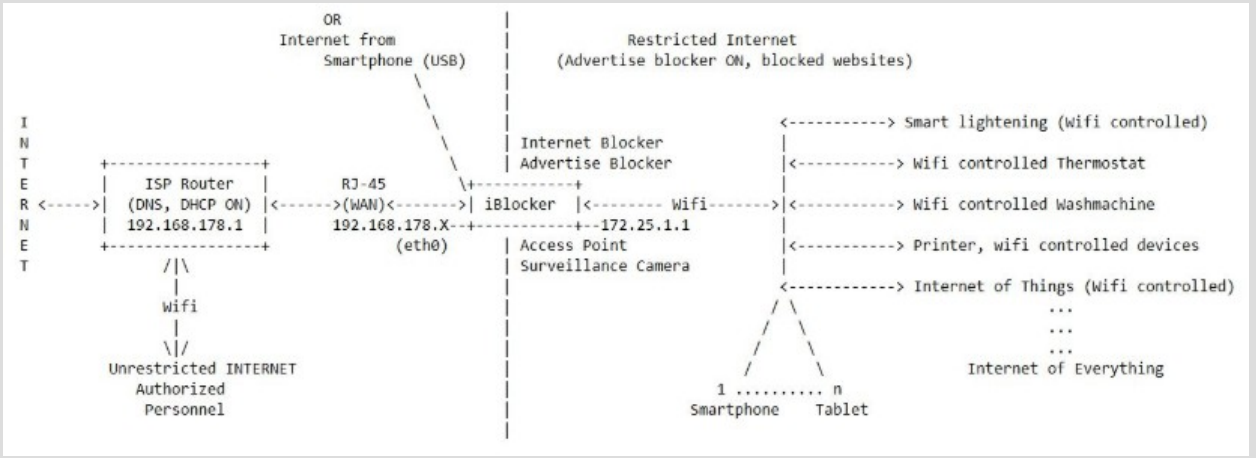
IPv6 enabled



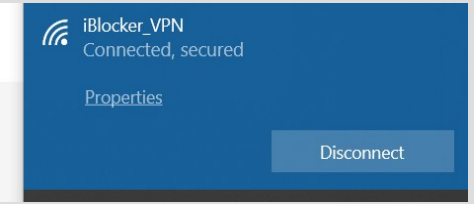
Test with IPv4 DNS record	**ok** (0.176s) using ipv4
Test with IPv6 DNS record	**ok** (0.155s) using ipv6
Test with Dual Stack DNS record	**ok** (0.140s) using ipv6
Test for Dual Stack DNS and large packet	**ok** (0.085s) using ipv6
Test IPv6 large packet	**ok** (0.151s) using ipv6
Test if your ISP's DNS server uses IPv6	**ok** (0.145s) using ipv6
Find IPv4 Service Provider	**ok** (0.201s) using ipv4 ASN 8881
Find IPv6 Service Provider	**ok** (0.168s) using ipv6 ASN 8881

5. Wireless Camera & Access POINT





iBlocker has a builtin IPv4/IPv6 DHCP Server (4.4.3-P1), which offers IP from below ranges:
IPv4: range 172.25.1.10 - 172.25.1.200;
IPv6: range6 fdda:8765:4321:fdda::20 - fdda:8765:4321:fdda::200



hostapd v2.10 - 802.1X/WPA/WPA2/EAP/RADIUS Authenticator

5. Wireless Camera & Access POINT

Size:
10 x 7 x 4 cm

Power consumption

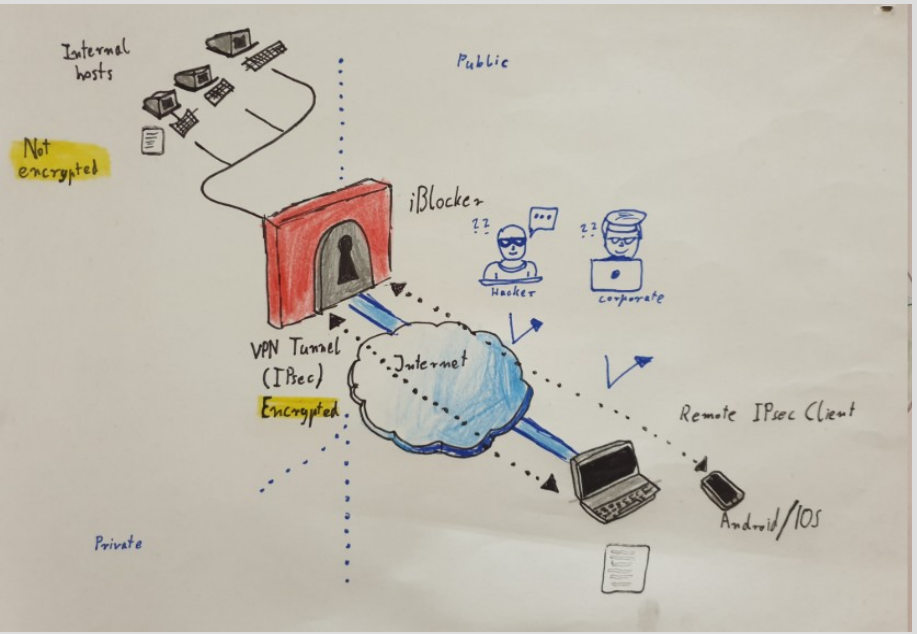
Idle	540 mA (2.7 W)
ab -n 100 -c 10 (uncached)	1010 mA (5.1 W)
400% CPU load (stress --cpu 4)	1280 mA (6.4 W)

Single Cam

Double Cam

5. Wireless Camera & Access POINT -VPN*

VPN available*



IPsec VPN server with IPsec/L2TP, Cisco IPsec and IKEv2

Used Libreswan as the IPsec server, and xl2tpd-1.3.12 as the L2TP provider.

*** Special LTE sim needed**

Wireless Camera & Access POINT