



TELECOM ITALIA GROUP

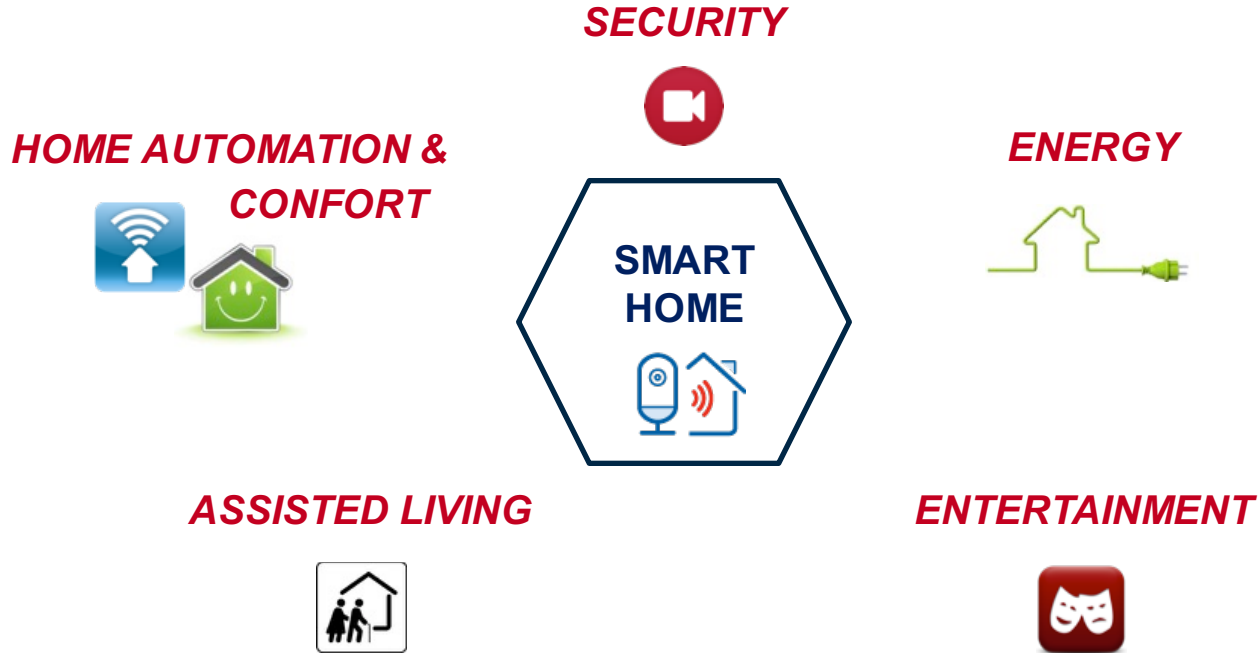
## Controlling the Smart Home from the VSDL Home Gateway: opportunities and lack of standards

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W3Ctrack @www2016



# Smart objects and Smart Home: application domains



# Smart Objects communication patterns and market strategies

- Commercial Smart objects mainly follow communication patterns which happen to help creating and protecting walled gardens
- This is leading to an ecosystem of non-interoperable vertical silos which constrains the ability to create new composite services and to get closer to users' real needs
- What happens to personal data? Does it make sense that a service provider gets to know each time I switch on and off a light bulb at home?

# Smart Objects communication patterns

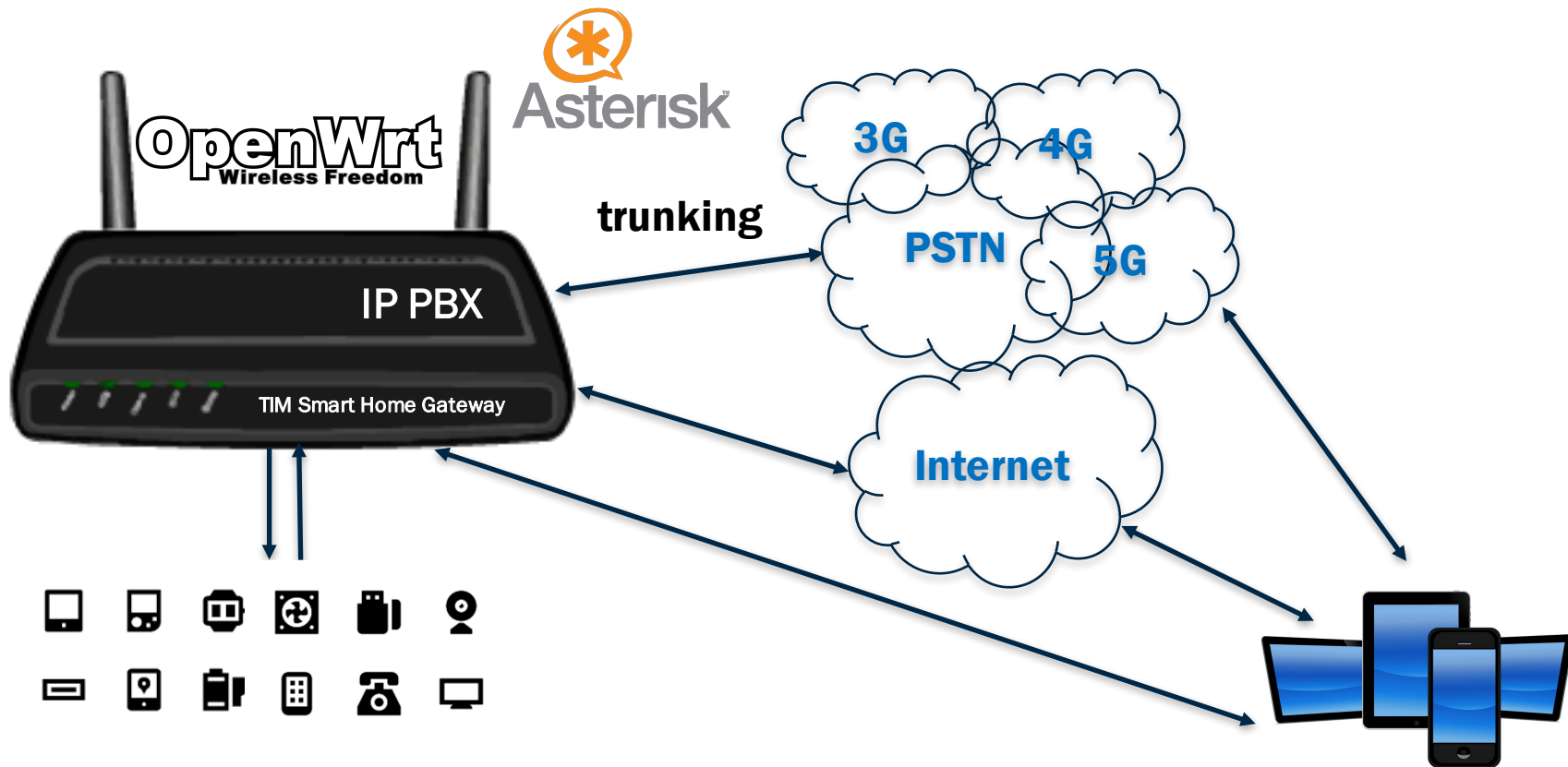
- Device-to-Gateway: vendors provide «smart objects» normally to be linked to proprietary gateways, often non IP based devices with pros and cons
- Device-to-Cloud: vendors provide «smart objects» that need to connect to a service provider cloud, often with Back End data sharing pattern
- Device-to-Device: vendors provide devices which are capable to talk to without proxying features



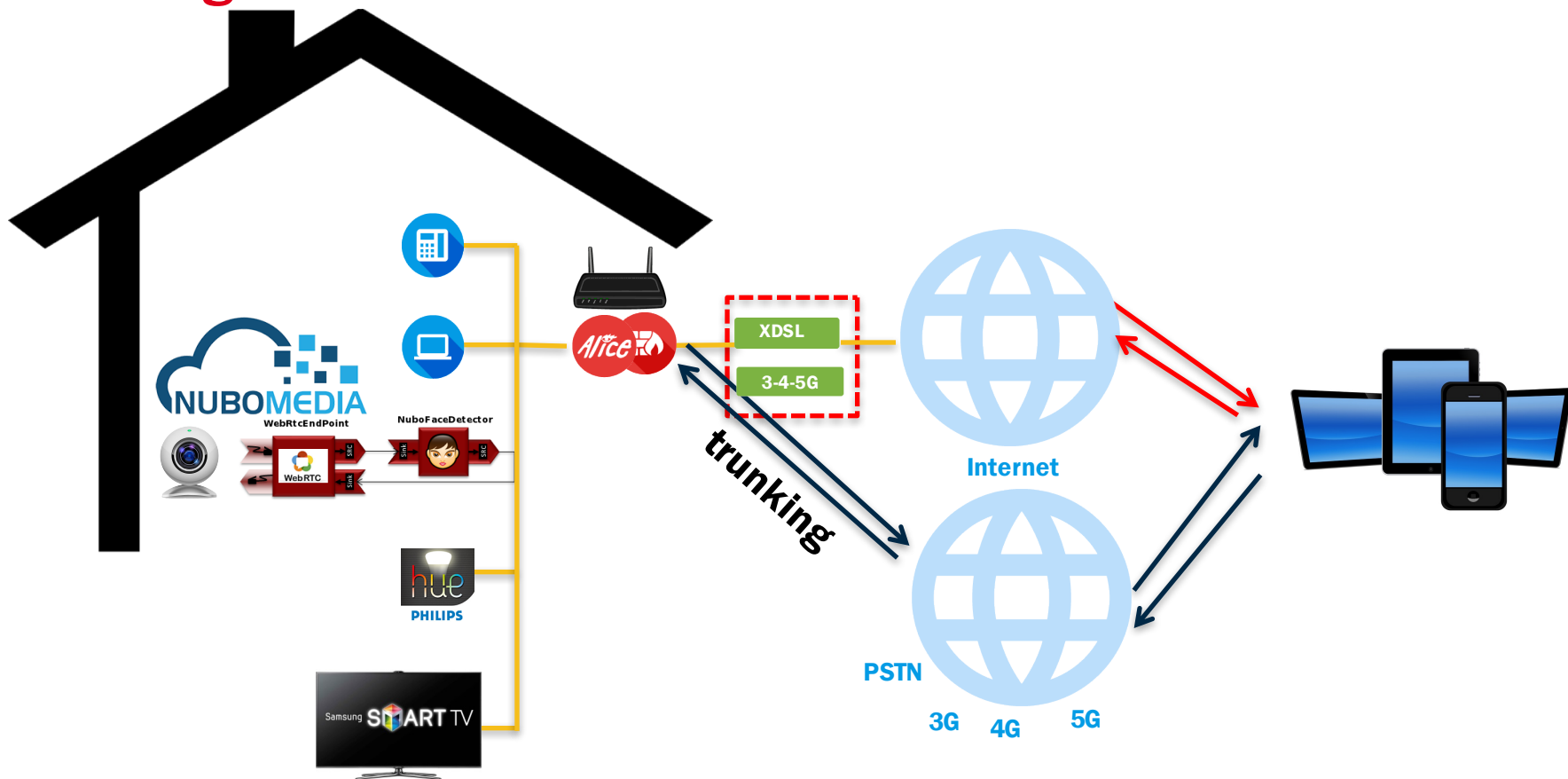
# Why using a Telco Home gateway to control the smart home could be a good idea?

- It is already there and can rely on an established customer caring network
- It can let users decide whether or not sharing their personal data with cloud service providers without affecting their QoE
- Users are not obliged to introduce more gateways/hardware in their houses besides the smart objects
- Maybe integrating with telephony is not a bad idea and increases confidence
- Telcos have no interest in creating more fragmentation, but rather offer this as a commodity for customer retention.

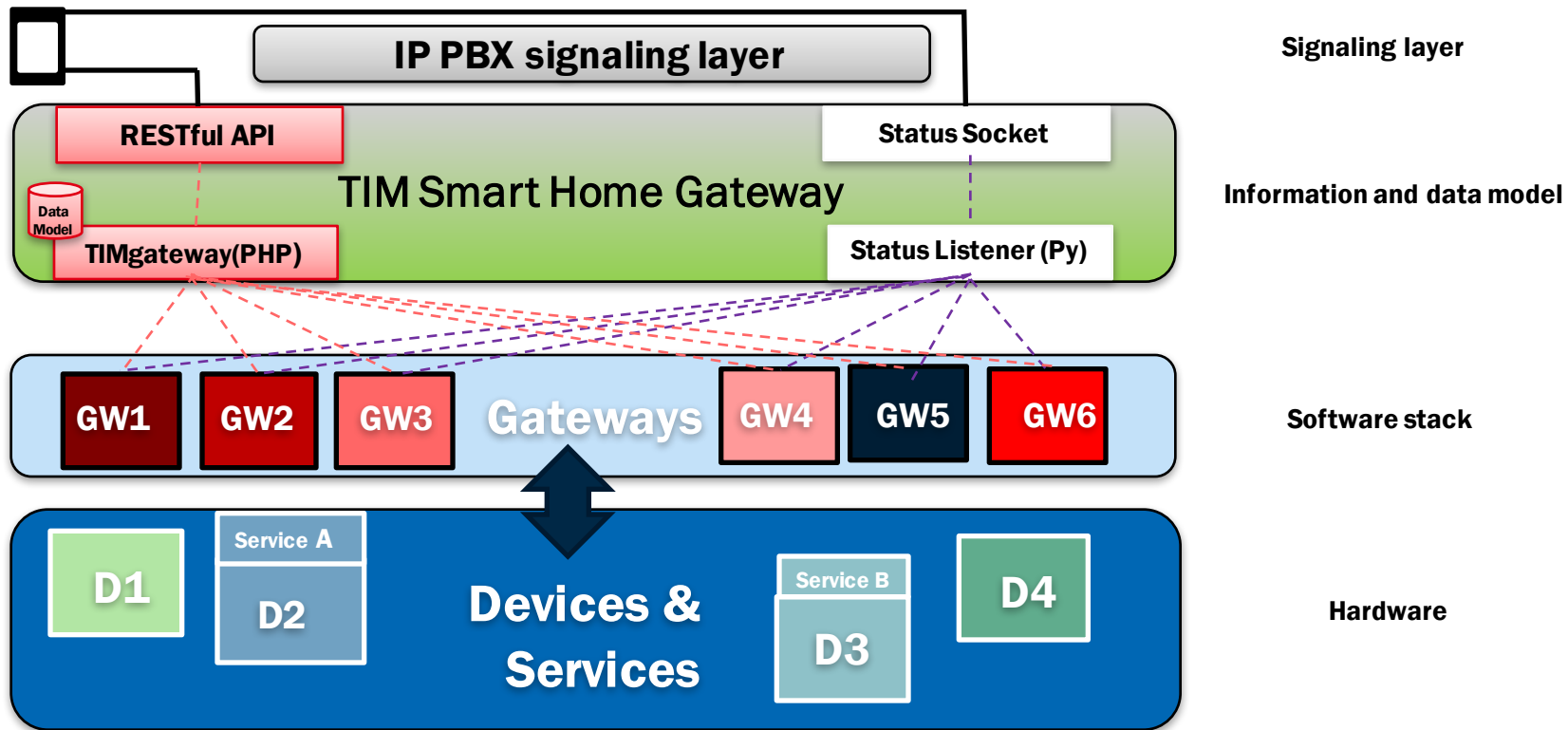
# A Smart Home enabled VSDL router prototype



# Controlling the Smart Home from a VSDL Router



# Let's try to put some order: a losing game





# TIM Smart Home Gateway signaling module

- Signaling and its scalability and reliability is mandatory in order to connect and orchestrate an increasing number of smart objects
- Deployed VSDL modems are already voice over IP (SIP) enabled
- SIP Trunking resolves NAT transversal issues

# TIM Smart Home Gateway Modules



**RESTful API:** PHP module responsible of offering an homogeneous interface to the mobile client. Device of the same type can be controlled with the same command set, regardless of vendor, subgateway etc. looking forward to **W3C** recommendations here

**TIMgateway:** PHP module responsible of «translating» the homogenous commands interface from the client into the proper commands for the target device.

**Status Listener:** Python Module responsible of monitoring events sent by Gateways via subscriptions technologies such as SSE or Websocket

**Status Socket:** Python Module responsible of exposing events to clients via WebSocket in a uniform format, regardless of subgateway and device.

# Gateways Layer and dialects' translation



A set of Sub-Gateways (aka ALG), providing access primitives and radio interfaces,  
has already been integrated and is supported by the platform:

- **QIVICON** : Platform powered by DT, Device Interfaces available: Zigbee, Homematic, Ip



- **FlexGateway** Hardware by Flex, Jemma Software onboard (OSGI based), Zigbee Radio Interface

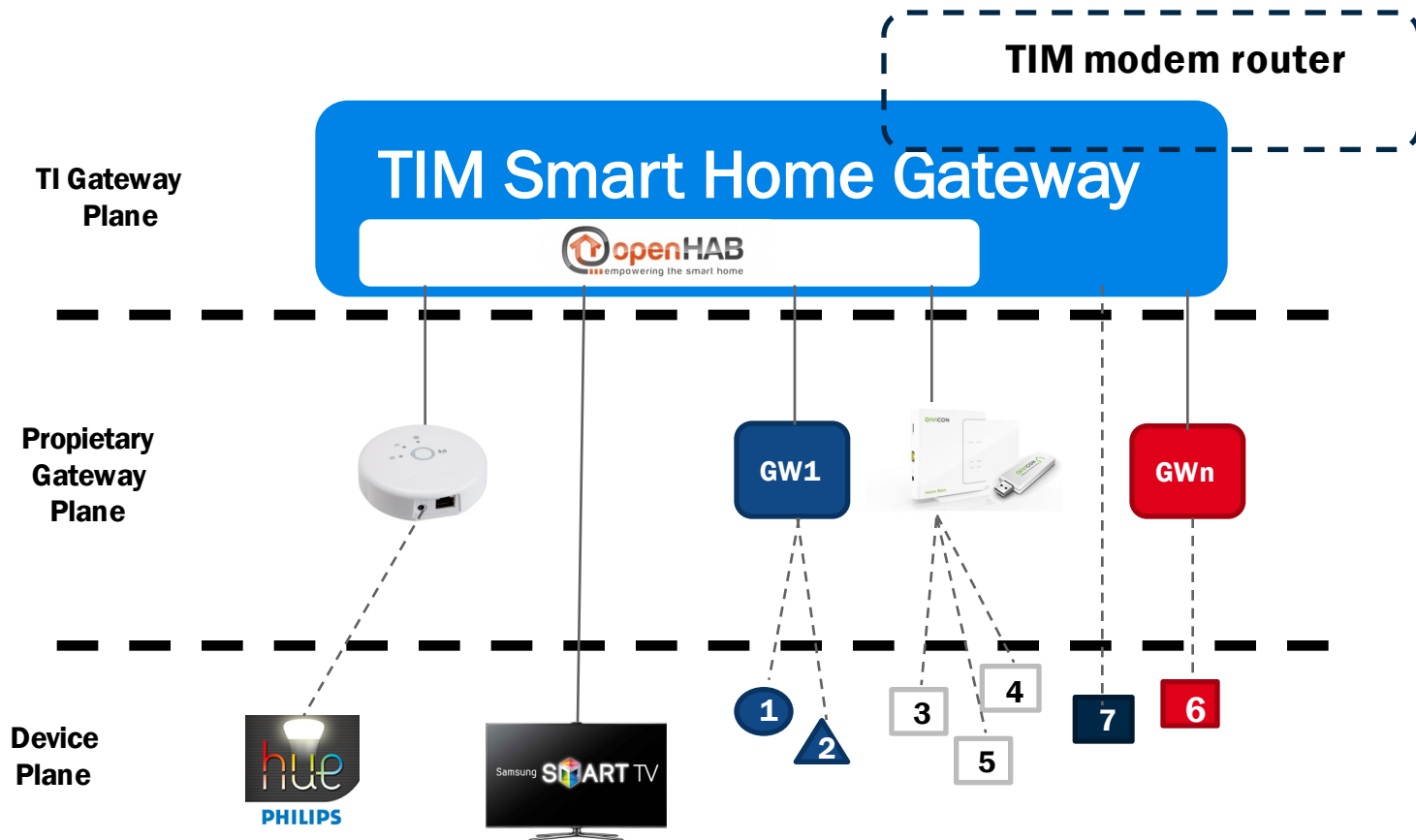


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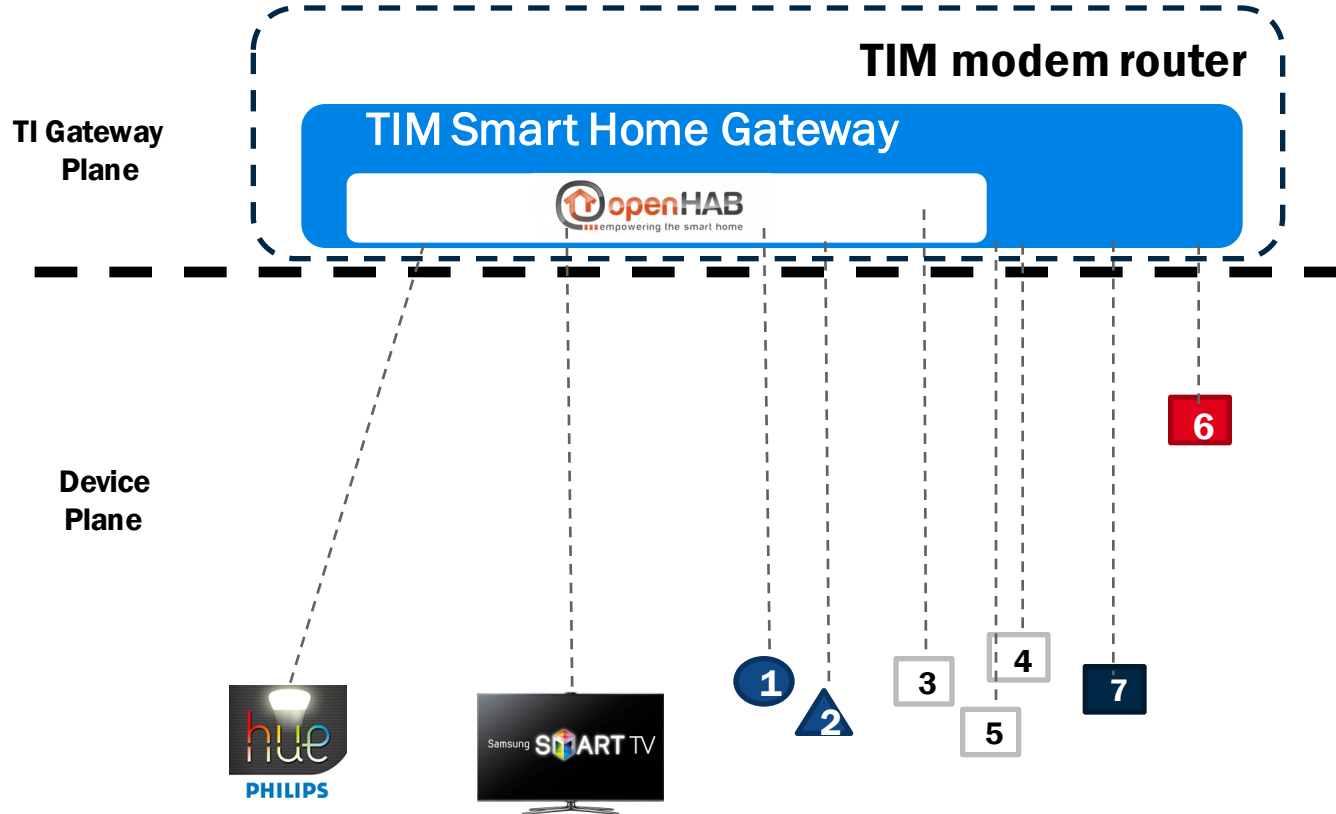
- **Openhab2**: openHAB is a Java based software which provides an extensible sw abstraction layer for Smart home service developers to manage heterogeneous smart objects without having to speak their numerous specific dialects



# Simplified starting point



# Simplified target Architecture



Thanks



# Devices Integration Status

Name	Type	Vendor	Protocol	Radio GW	Integrated	Note
eQ3 PowerMeter Sw/Act	Smart Plug	eQ3	HomeMatic	Qivicon	Cli -> TIGW -> Qivicon	
eQ3 Dimming Actuator	Smart Plug	eQ3	HomeMatic	Qivicon	Cli -> TIGW -> Qivicon	
eQ3 Door Sensor	Door Sensor	eQ3	HomeMatic	Qivicon	Cli -> TIGW -> Qivicon	
eQ3 Motion Sensor	Motion Sensor	eQ3	HomeMatic	Qivicon	Cli -> TIGW -> Qivicon	
eQ3 Magnetic Contact	Door Sensor	eQ3	HomeMatic	Qivicon	Cli -> TIGW -> Qivicon	
Philips Hue	Hue/Color	Philips	Zigbee Light Link	Philips	Cli -> TIGW -> QIVICON Cli -> TIGW -> Philips	
Samsung Smart TV	SmartTV	Samsung	TCP/IP		Cli -> TIGW -> Device <u>Cli -&gt; TIGW -&gt; QIVICON</u>	
Osram Lightify Bulb	Smart Light	Osram	Zigbee	Qivicon	Cli -> TIGW -> Qivicon	
Osram Led Strip	Smart Light	Osram	Zigbee	Qivicon	Cli -> TIGW -> Qivicon	
Osram Gardenspot	Dimming Light	Osram	Zigbee	Qivicon	Cli -> TIGW -> Qivicon	
CleoBee Zmove	Motion Sensor	Cleode	Zigbee	Cli->TIGW->FlexGw	CleoBee Zmove	Motion Sensor
FlexPlug(2X)	SmartPlug	Flexplug	FlexPlug	FlexGate way	Cli->TIGW->FlexGw	
4Noks Zr-Plug-EU-Eh	SmartPlug with metering	4-noks	Zigbee	FlexGate way	Cli->TIGW->FlexGw Cli->TIGW->QIVICON	
Bitron Home Plug (2x)	SmartPlug	Bitron Home				

# Devices Needing more Investigation

Name	Type	Vendor	Protocol	Integration Notes
<u>CleoBee Zmove</u>	<u>Motion Sensor</u>	<u>Cleode</u>	<u>Zigbee</u>	<u>Cli-&gt;TIGW-&gt;FlexGw</u>
CleoBee Zlight (2x)	Two Light Controller	Cleode	Zigbee	Power Supply?
CleoBee Zdoor	Door Sensor	Cleode	Zigbee	Does not pair with Zload / Qivicon
CleoBee ZRC	CleoBeeMotion Sensor	Cleode	Zigbee	Power Supply
CleoBee Zload	Gateway	Cleode	Zigbee/Usb	Successfully installed on windows, does not pair with Door Sensor (could not try other)
<u>FlexPlug(2X)</u>	<u>SmartPlug</u>	<u>Flexplug</u>	<u>FlexPlug</u>	<u>Cli-&gt;TIGW-&gt;FlexGw</u>
<u>4Noks Zr-Plug-EU-Eh</u>	<u>SmartPlug with metering</u>	<u>4-noks</u>	<u>Zigbee</u>	<u>Cli-&gt;TIGW-&gt;FlexGw</u> <u>Cli-&gt;TIGW-&gt;QIVICON</u>
WinkHub	Gateway	WinkHub	???	Does not work without «LINKHUB» providing Wifi connection.