

Novel Services in Smart Home

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About me

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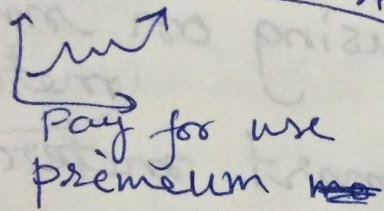
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- Doing master thesis with iotsec project team
- <http://www.ietf.org/>

Smart Home

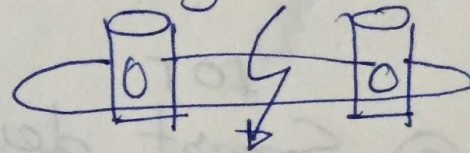
- Smart home consists of
 - sensors
 - appliances
 - connected together seamlessly mostly without user's interruption.
 - here, we consider it connected with smart grid
 - Internet of Things and Services
- Novel services - using state of the art technologies in an Internet enabled home
- Here we investigate mainly smart appliances available now
 - Smart grid promotes smart appliances

BUSINESS INNOVATIONS



~~DIS~~ MARKET DISRUPTION

Mobility Energy



INTERNET of THINGS & SERVICES

INTERNET

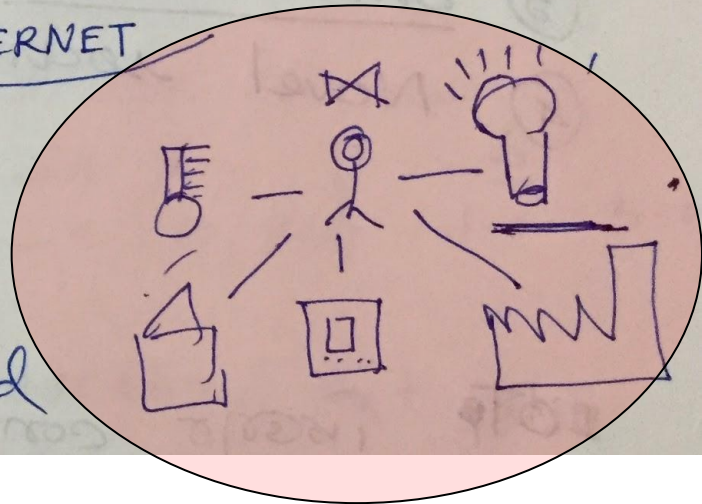
COMPETENCIES

Bosch DOMAIN

IT & SO.

CREATIVITY

Business success to connected world



Smart Appliances

- Home control system with a range of products
 - white goods
- Smart home security systems
- Smart kitchen

Our main focus here is to investigate the selected criteria to compare the novel services in a home automation and focus on smart usage of energy achieving the real benefit by connecting with smart meter and home gateway.

- smart services
- prospective future service
- focused on
 - efficiencies
 - security
 - usability
 - privacy

Smart Appliances - Focused Characteristics

- efficiency
 - how it or its smart features contribute to save energy and cost for its users.
 - related to the implementation of smart grid (smart meter)
- security
 - secure communication?
 - WiFi, Bluetooth, Zigbee or NFC
 - Store data in cloud or in LAN
- privacy
 - communication or control through internet - data passes through manufacturer's server
- usability
 - user's need to learn? learning curve?
 - unobtrusive?
 - self learning?

Nest Products

- Wi-Fi-enabled thermostats,
 - Webcam,
 - smoke detectors, and
 - other security systems.
-
- programmable,
 - self-learning,
 - sensor-driven,

Thermostat :

- Learns user lifestyle, season
- Adapt temperature
- Compatible with most HVAC systems
- Conglomerate with other devices such as whirlpool washing machine
- Devices are interconnected with each other using protocol Weave (which is based on IEEE 802.15.4 and Wi-Fi 802.11 b/g/n) .
- Supports openHAB - to be incorporated with other home automation devices.
- Efficiency
 - save an average 20% energy consumption - turn itself down to save energy when user is away
- Usability
 - Touch sensitive display.
 - Learn when to shut down and switch on
 - Remotely controllable by smartphone and web interface.
- Privacy : The communication is done through Nest as well as data are routed through them. Automatic adaption may cause infringement of privacy.



Nest Cam

- Works with Nest thermostat.
- Switch on itself.
- With 24/7 live streaming
- looks for motion and sends an alert to your phone if it sees something.
- advanced Night Vision,
- Activity alerts, one app for all your Nest products
- Advanced algorithms in the cloud using depth sensing and face detection

Whirlpool 6th Sense Live

Whirlpool produces a smart appliances with '6th Sense Live Technology'.

- smart washing machine
- interactive kitchen

This machine reduces energy usage, optimize and track energy by connecting to the smart grid.

Whirlpool 6th Sense Live - washing machine

- Smart energy features
 - Energy Advisor, Rate Revealer and Smart Delay
- Smart stat (Product information)
 - start date, days online and cycle progress, history
- Work with Nest learning Thermostat - home/away mode
- Security: uses WiFi, register to the vendor's system.
- Usability: Smartphone app
 - detergent dispenser, send notifications, touch control, voice command



Interactive kitchen

Interactive kitchen have options to

- Warming coffee cup, infant milk bottle at desired temperature
- Suggest lunch menu
- Using Amazon dach replenishment.

Belkin WeMo

WeMo is a family of simple, ingenious products that make life easier, simpler and better.

- WEMO Insight Switch- turn plugged in devices on/off. controlled via IP network.
- light sensor,
- Smart Heater , auto frost protect feature
- slow cooker,
- coffee maker,
- room heater,
- video camera etc



Belkin

Services:

- Remote Scheduling
- send notification
- Control via IP network,
 - risk for malicious attack. Had security flaws earlier in its UPnP implementation that allows an unauthorized user to take control of the switch.

Support:

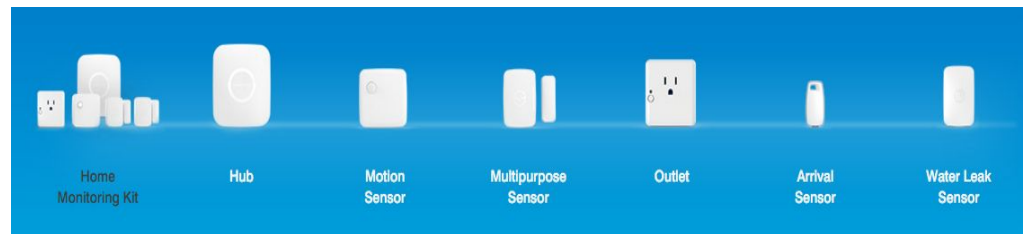
- IFTTT Technology
- openHAB

Philips Hue Product

- Personal wireless lighting product
- 3 bulbs support full spectrum of color
- uses WiFi
- control with Mobile App, remotely through Hue Bridge
- Possible to control
 - multiple bulbs, multiple lighting systems
 - changing color set by mood, image saved from phone
- Light can sync with music.
- Technology:
 - Geo-fencing Technology (lights can be on and off)
 - open ZigBee Light Link standard (integrate with if it has)
 - Supports Apple's homeKit



SmartThing from Samsung



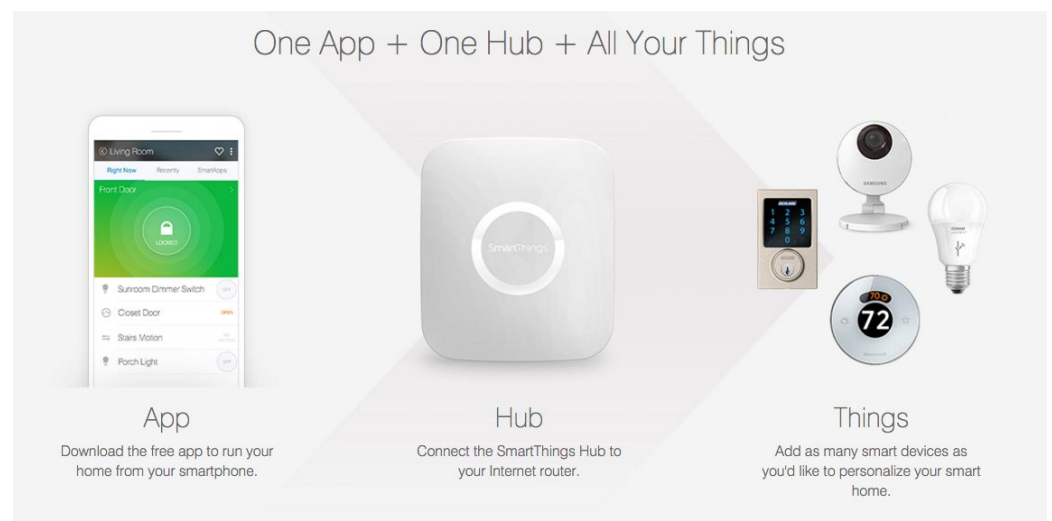
- Smart hub to control smart devices.
- an open platform for smart homes and the consumer of Internet of Thing
- equipped with Wi-Fi and Bluetooth connectivity
- it obtains its objectives through the uses
 - hub - "gateway" or "home controller",
 - cloud platform, and
 - client applications.

SmartThing from Samsung

- works with many third-party IoT appliances
 - From Netgear, Philips, Honeywell and August.
- can integrate the products to form a connected house with products from partners like
 - Philips Hue, Belkin WeMo etc.
- With SmartThings app it is possible to control all smart devices in a smart home.
- connects directly to a home's internet router
 - compatible with communication protocols such as ZigBee, Z-Wave, and IP-accessible devices.
- SmartThings Shop

SmartThing

- SmartThings Arrival sensor
- SmartThings Water Leak Sensor
- Connected camera
 - video recording for unexpected
 - entity, motion or sound detected when user is unaware.
- Alarm - flashing siren, multi purpose sensors or motion sensors.
- Thermostat
- Smart Lock - lock/unlock from anywhere
- Power Outlet - control from anywhere, iron plug switch off.
- Possible to set up different notification as per importance.

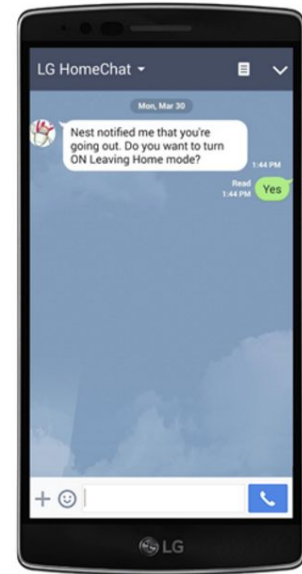


LG Smart ThinQ

- series of smart appliances
 - interoperate among themselves using LG HomeChat hub.
- HomeChat hub is also compatible with other devices including the Nest Thermostat.
 - LG call communications between hub and the devices a 'chat' as it sends message through app which can control devices remotely
- turning on washer, updating washing cycles, checking refrigerator's inventory and commanding robot vacuum to clean living room carpet
- able to diagnose issues with compatible products such as LG Smart ThinQ ovens and fridges.
- Apps show energy usage

LG Smart ThinQ

- Features Smart Grid,
- Access
 - control and monitor appliances from outside
- Refg. count no. of door opening
- Display shows each appliance's energy consumption.
- SmartThinQ Sensor -
 - designed to work with traditional low-tech devices to make smart aware.



Honeywell Tuxedo Touch



- Honeywell has a broad range of home security and automation products.
- It provides seamlessly integrated security with
 - voice commands - Wakeup, BedTime, Returning home, Evening, Leaving the house, Cameras in voice list.
 - video viewing and recording
 - control Z-Wave enabled thermostats
- Total Connect Remote service -
 - Control Tuxedo Touch
 - Receive important alerts
 - Live video on up to six camera at a time to keep an eye on family members. record two minutes video clips on a SD card for visual verification of an alarm event or system activity.

Honeywell Tuxedo Touch (cont...)

- Environmental Sensor - detects floods, leaks, extreme temp.
 - Honeywell state-of-art sensor is capable to sense movement by listening sound and send alert to phone.
- Wireless theft protection sensors- can be affixed to any valuable things, that send alert when attempt to move or disturb the object.
- Panic pendants-
 - provide secure feeling by summoning emergency help
 - send signal to central station to call emergency
- The door locks can be unlocked from office -
 - can auto turn on/off with arm and disarming security system
 - Scene and schedules for adder safety and convenience.
 - Lock supports programming scene and scheduling and remote control.

Honeywell Tuxedo Touch (cont...)

- outdoor lights automatically turn on at sunset and off at sunrise
- Touchscreen hub can organize video monitoring , smart lock, heating and so on. Just need voice command to activate home monitoring.
- Built in web server
 - allows for local control of the system through any WiFi enabled device
 - Remotely lock and unlock doors, schedule lock system, arm, disarm or check the security system.
- Security
 - can be monitored by central systems if user want. They have highly trained home security professionals always stand by, ready to send help.

Aros Smart Air Conditioner

- smart air-conditioning system
 - learns from your budget, location, schedule, and usage to automatically maintain the perfect temperature and maximize savings for your home.
- uses smart phone's GPS to turn off when user leave and set perfect temperature at home when user come back home.
- Except the mobile app it is not compatible with any kind of smart home gateway's standard protocols.



Sensibo



- a small device that turns any air conditioner into a smart air conditioner
- The compatible air conditioners must have a remote controller.
 - Uses IR commands
- as well as reduces its energy consumption.
- Connect Internet through WiFi.
- Set timer
- pre heat
- adapting with lifestyle
- supports IFTTT, Amazon Echo, SmartThings, OpenHAB and Apple HomeKit

SkylinkNet Home Security System

- smarter' home security system
- window and door fixtures contain motion sensors
- alert you when there is a trigger through an accompanying application.
- easy to set up and connect with the smartphone,
- comes with a keychain hob which allows users to remotely alarm and disarm a system
- 'panic' button, which if pressed, alerts the connected smartphone to the call for help.
- Skylink HomeControl Receiver
 - home automation is possible in terms of lights and appliances switching on and off,

Kevo

- Kevo (Key Evolved) from Kwikset
- electronic deadbolt which communicates with a Kevo Fob and accompanying smartphone app to lock and unlock a door.
- Interoperate with Nest
- temporary eKeys can be given to friend to open the door

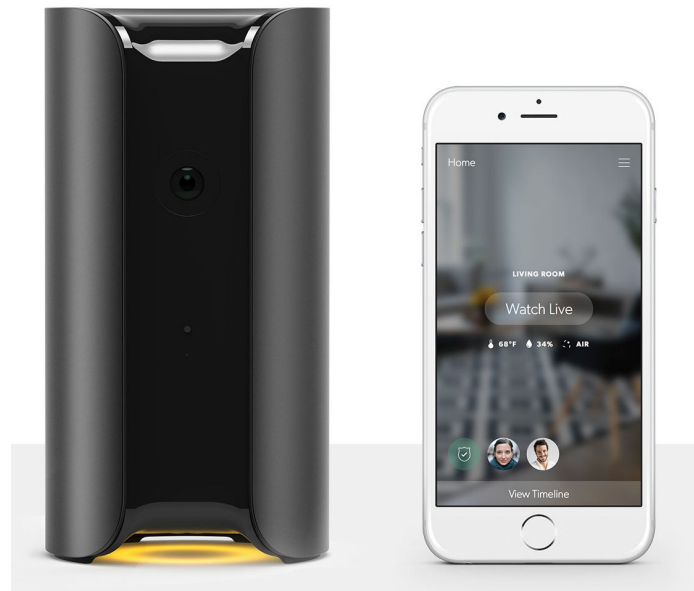
Skybell

- SkyBell is a smart video doorbell
- Skybell also works with Nest



Canary

- security system into a sleek box
- Two way audio
- Home health technology
 - monitors air quality,
 - temperature, and
 - humidity.



SwannOne



- comprehensive security system
- single platform
- uses the latest wireless technology such as Wi-Fi, ZigBee and Z-Wave
- integrate with other leading smart home brands and devices, such as
 - Philips Hue, GE Jasco and WeMo lighting;
 - nest thermostat;
 - Kwikset, Weiser, Yale, Assa Abloy and Lockwood locks;
 - Samsung SmartThings and CentraLite Smart plugs; and
 - Chamberlain Garage Door Openers.

Service Standards

Smart appliances use wireless technology such as, bluetooth, zigbee, Z-wave, RF, IR or WiFi.

Service standards:

- openHAB
- IFTTT
- Apple HomeKit
- Amazon Dash Replenishment Service

openHAB

A software for integrating different home automation systems and technologies into one single solutions

- open Home Automation Bus
- automation rules
- uniform user interfaces and web-based UI
- Bindings (scripts) are optional packages that can be used to extend functionality of openHAB.
- can run on any device that is capable of running a JVM
- is easily extensible to integrate with new systems and devices

IFTTT (IF This Then That)

A free web-based service that allows users to create chains of simple conditional statements.

- ‘recipes’ - conditional statements
- triggered based on changes to other web services such as Gmail, Facebook, Instagram, Pinterest etc.
- ‘channels’ - connect the external services that triggers an ‘action’.
- Producer must provide compatible IFTTT channel.
 - Nest thermostat
 - Philips Hue



- *if the user is tagged by someone on Facebook, then that photo will be added to the user's cloud-based (e.g. Dropbox) photo archive.*
- *“When your Nest is set to away, your lights will turn off”*

Apple HomeKit



- home automation API from Apple
- Discover accessories and add to the HomeKit Collection. Have you purchased a smart plug or lamp, you can add that to your collection.
- Hardware manufacturer must have MFi license from Apple
- home automation can be controlled easily without each of them having their own app.
- communication - IP, bluetooth, bonjour
- only for iOS devices - iPhone/iPad/iPod

Amazon Dash

Amazon Dash Replenishment Service (DRS) enables connected devices to order physical goods from Amazon when supplies are running low

- *washing machine detergent dispenser orders more detergent when it is going to be empty.*
- Leverages
 - Amazon's authentication and payment systems,
 - customer service, and
 - fulfillment network—giving their customers access to Amazon's low prices, great selection, and reliable delivery
- Two ways to connect
 - physical button or
 - can measure consumable usage so that reordering happens automatically.

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Questions?

