Smart Home Design with DSL-Modem Using Cisco Packet Tracer Simulator

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Abstract— **IoT is a revolutionary technology that gives life to the devices around us. It has the power to modernize our home, city and business alike. However, the implementation of IoT is rarely seen in real life. So in this paper, we showed a smart implementation of IoT devices and how it can change our general environment. IoT can give us complete control of each and every device we use in our day to day life and enhances the overall security of our society. To design smart home we used some different device for home security, safety and home environment prosperity.**

Keywords— *IOT, Smart home, packer tracer, sensor, home gateway, DSL-Modem.*

I. INTRODUCTION

A. Background

Now, the advancement of electronic devices and artificial intelligence is helping us in every step of our life. IoT provides us a way to use them as we use our limbs. IoT allows companies to automate processes and save money on labor. It reduces waste and improves how we provide services, which make production and delivery of products less expensive and provides transparency in customer transactions. IoT is the key to a smart environment that adds more comfort in our day-to-day life and secures our belonging. IoT forms a bridge between machines and people [1]. To research done in the past, it is estimated that the number of devices connected to the internet will pile up 2.1 billion between 2021 from 100.4 million which was count in 2011, 36% of the increasing rate. And the M2M (machine to machine) connections will increase by almost 13% in 2021 from 2011 [2].

B. Motivation

Nowadays, web is all over, every home have its own wireless fidelity Network, everyone encompasses a smart phone. That these improvement achieved to the humanity, opened the door to a replacement nomenclature referred to as IoT (Internet of Things). IoT is that the networking of physical devices embedded with physical science, software, sensors, actuators and network property that change these objects to gather and exchange knowledge [3-10].The typical mechanism is currently tailored to fashionable days. However these new strategies for dominant what happens within the house got to be simple to use and perceive. Individuals would like ways that for simplifying their actions and not solely adapting them to times. The smart devices should be simple to integrate within the home surroundings.

C. Paper Organization

This paper contains six sections. Section I contains Introduction, section II provide related work, section III provide methodology, section IV will provide result and analysis, section V will provide conclusion. The references have been attached in the last segment.

II. RELATED WORK

Home automation or smart homes will be delineate as introduction of technology among the house surroundings to supply convenience, comfort, security and energy potency to its occupants [3] With the introduction of the internet of Things, the analysis and implementation of home automation are becoming additional widespread [4] Various wireless technologies that may support some sort of remote knowledge transfer, sensing and management like Bluetooth, Wi-Fi, RFID, and cellular networks are utilized to introduce varied levels of intelligence within the home [5] The studies in [2, 6] have given Bluetooth primarily based home automation systems victimization robot sensible phones while not the net controllability. The devices square measure physically connected to a Bluetooth sub-controller that is then accessed and controlled by the sensible phone victimization intrinsic Bluetooth property. Researchers have additionally tried to produce network ability and remote access to manage devices and appliances reception victimization home gateways [7] proposed mobile information processing primarily based design and its potential applications in smart homes security and automation with none actual readying and testing. latterly few researchers have additionally given use of net services, simple object access protocol (SOAP) Associate in representational state transfer (REST) as an practical application layer to remotely access home automation systems. [8]

III. METHODOLOGY

In order to implement smart home I used new discharged cisco packet tracer, including totally different smart object used for home automation like smart fan, smart window, smart door, smart lightweight , smart A.C, room temperature device, field mechanical device and totally different sensing element is enclosed.
To control this smart object and detector, 2 dsl-modem and residential home gateway used, since it offer programming atmosphere for dominant smart object connected to that and supply dominant mechanisms by registering smart device to home gateway severally.

A. Home Gateway

Home gateway have four local area network ports additionally to a wireless access purpose organized with the "Home Gateway" SSID (see fig 1).To secure wireless affiliation WEP / WPA-PSK / WPA2 enterprise may be organized on home gateway. The figure a pair of shows six web of Things device connected to a Home gateway by victimization coaxial cable and wireless. To attach the house entranceway to the web its web WAN local area. Network port obtainable on home getaway. The IoE device may be remotely managed through an internet interface hosted by

the home gateway. The home gateway internal (LAN) ip address is 10.0.0.253 however it may also be accessed through its web facing informatics address.

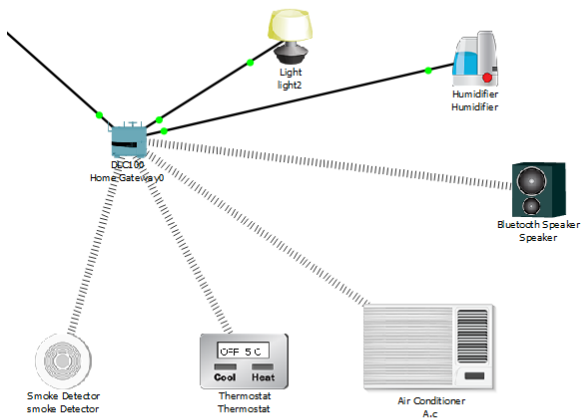We used two home gateway device to connect twelve devices.

Fig1: six smart thing connected to Home gateway

This figure shows the smart object is connected to the home gateway exploitation coax and wireless medium to manage smart device native and remotely. Home gateway conjointly works as DHCP server by distribution ip address to every smart device that connected to it.

B. DSL-Modem
- ✓ Power light-weight - indicates that the electronic equipment is turned on and has power.
- ✓ Ethernet lights - there's sometimes a lightweight over every LAN jack. a gentle (or generally flashing) Light-weight indicates that the LAN link thereto laptop or device is functioning.
- ✓ DSL light-weight -a gentle light-weight indicates that the instrumentality} has established contact with the equipment within the native exchange (DSLAM) therefore the telephone circuit link over the phone line is functioning. Newer modems that support ADSL2+ bonding can have one light-weight for every line
- ✓ light-weight - a gentle light-weight indicates that the science address and DHCP protocol area unit initialized and dealing, therefore the system is connected to the web
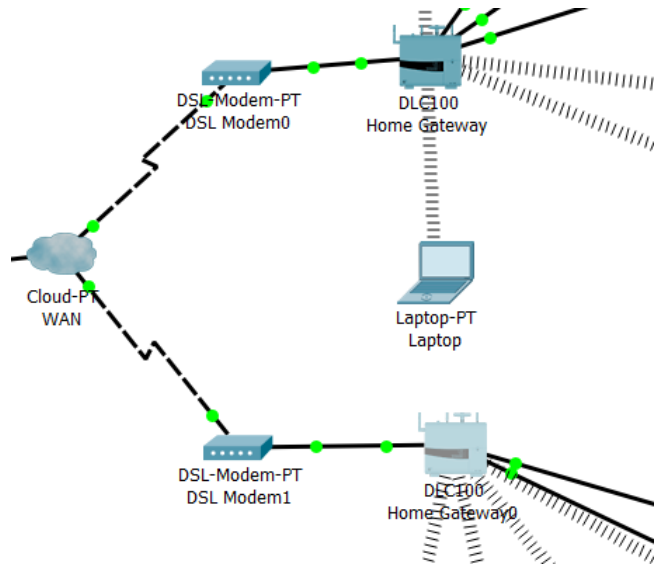

Fig2: DSL-Modem connection

- ✓ Light-weight - a gentle light-weight indicates that the science address and DHCP protocol area unit initialized and dealing, therefore the system is connected to the web Training is the portion where the dataset is trained by input with ordinary output.
- ✓ Wireless light-weight - solely in wireless telephone circuit modems, this means that the wireless network is initialized and dealing many routers offer an interior web content to the native network for device configuration and standing coverage. Most telephone circuit routers area unit designed to be put in by the client that a CD or videodisc containing associate degree installation program is equipped. The program might also activate the telephone circuit service. Upon powering the router it's going to take many minutes for the native network and telephone circuit link to initialize, sometimes indicated by the standing lights turning inexperienced. There are PCI telephone circuit modems that plug into associate degree offered PCI card slot on a laptop.

IV. RESULT AND ANALYSIS

For implementing smart home devices, we tends to use sensors, smart devices and apply some condition to make it smarter. DSL-modem is that the new factor in our smart home project. We use two home gateway that's why need two modem, and we use DSL-modem for the first time in smart home gateway.

In the projected smart home system home gateway device is connected to sensors, lights, air-conditioner, camera, windows and door system, and varied appliances. The DSL-modem is connected with home gateway. Gateway within the projected sensible home network plays a crucial role as it add an additional security layer to the smart home network therefore creating the projected system safer. The projected smart home system is capable of playacting varied functions like watching setting for air quality and security purpose, dominant home appliances, locks, doors and windows from

remote location, generating alerts and notifications at predetermined conditions, adjusting area lighting and temperature by sensing intensity level and temperature/humidity level within the area and therefore mechanically dominant lighting system and air-conditioner.
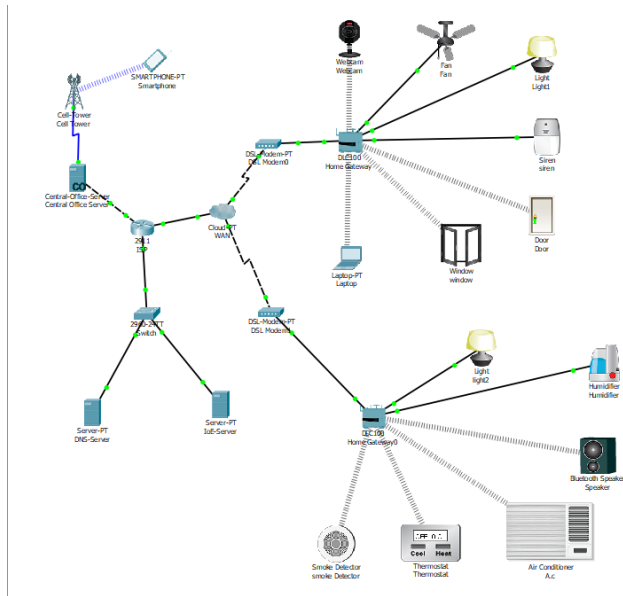

Fig3: Smart home architecture

Sensors to gather internal and external home knowledge and live home conditions. These sensors are connected to the house itself and to the attached-to-home devices. These sensors aren't internet of things sensors that are connected to home appliances. The sensors' knowledge is collected and frequently transferred via the local network, to the smart home server.

Processors for performing arts native and integrated actions. it's going to even be connected to the cloud for applications requiring extended resources. The sensors' knowledge is then processed by the local server processes.

A collection of software package elements wrapped as genus APIs, permitting external applications execute it, given it follows the pre-defined parameters format. Such Associate in Nursing API will method sensors information or manage necessary actions.

Actuators to provision and execute commands within the server or different management devices. It interprets the desired activity to the command syntax; the device will execute. Throughout process the received sensors' knowledge, the task checks if any rule became true. In such case the system might launch a command to the correct device processor.
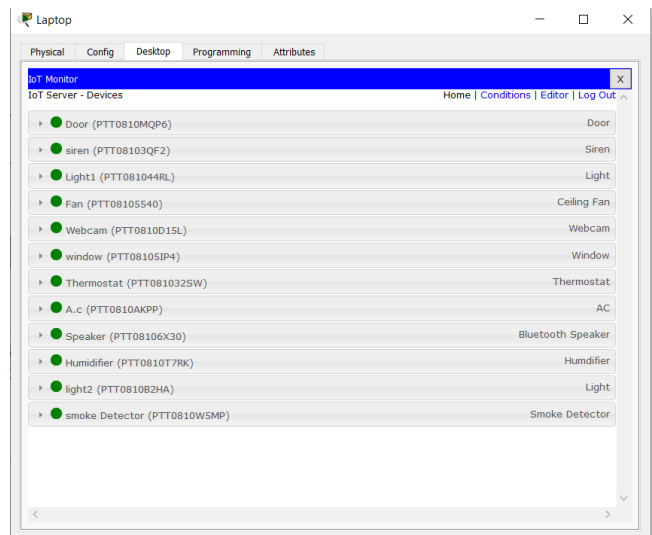

Fig4: registering IO device to Home Gateway

Creates the cloud service for managing home appliances which is able to be hosted on a cloud infrastructure. The managing service permits the user, dominant the outputs of sensible actuators related to home appliances, like lamps and fans. Smart actuators are devices, like valves and switches that perform actions like turning things on or off or adjusting associate operational system. Actuators provides a range of functionalities, like on/off valve service, positioning to share open, modulating to manage changes on flow conditions, emergency shutdown (ESD). To activate associate mechanism, a digital write command is issued to the mechanism.
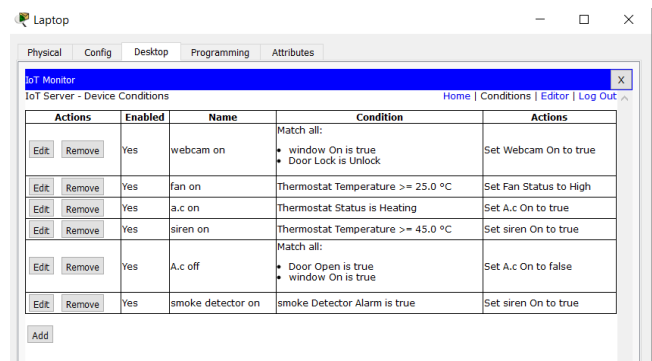

Fig5: smart device conditions.

A typical smart home is equipped with a group of sensors for measurement home conditions, such as: temperature, humidity, light-weight and proximity. Every device is devoted to capture one or additional measuring. Temperature and wetness is also measured by one device, different sensors calculate the sunshine quantitative relation for a given space and also the distance from it to every object exposed thereto. All sensors enable storing the information and visualizing it so the user will read it anyplace and anytime. To do so, it includes a symbol

processor, a communication interface and a bunch on a cloud infrastructure.

ISP router configuration

Router>enable

Routhe#conf term

Enter configaration commands,one per line. End with CNTL/Z

Router(config)#int g0/0

Router(config-if)#ip address 10.0.0.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#int g0/2

Router(config-if)#ip address 209.165.201.225 255.255.255.224

Router(config-if)#no shutdown

Router(config-if)#int g0/1

Router(config-if)#ip address 209.165.200.225 255.255.255.224

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#ip dhcp excluded-address 209.165.201.225 209.165.201.229

Router(config)#ip dhcp pool CELL

Router(dhcp-config)#network 209.165.201.224 255.255.255.224

Router(dhcp-config)#default-router 209.165.201.225

Router(dhcp-config)#dns-server 10.0.0.254

Router(dhcp-config)#exit

Router(config)#ip dhcp excluded-address 209.165.200.225 209.165.200.229

Router(config)#ip dhcp pool WAN

Router(dhcp-config)#network 209.165.200.224 255.255.255.224

Router(dhcp-config)#default-router 209.165.200.225

Router(dhcp-config)#dns-server 10.0.0.254

Today's home-routers (much like business routers) area unit vertically inte-grated, with numerous feature sets and management-interfaces bundled onto the device at production time. Our architecture encourages such vendors to antedate user-interface development, and instead concentrate on supporting genus APIs that enable associate degree external entity (the SMP) to configure network behavior (our prototype leverages ASCII text file platforms like OpenWRT and OVS).This reduces the event burden on vendors, allowing them to concentrate on their competitive advantage, whereas the cloud-based management model will provide them higher feedback on feature-usage on their devices. an identical argument applies to the ISP, United Nations agency nowadays provides very little over net property, which is recognized as a low-margin business with little revenue growth. Our design offers ISPs the simplest way to monetize on mass-market residential net service customization, without usurping the burden of client management, by exposing network-level capabilities via appropriate genus APIs to an external entity (the SMP). Lastly, the network configurations underlying the genus APIs is machine-driven exploitation SDN technology (as delineated within the next section), and also the ISP will therefore support them at low price.

Result
The planned system is incredibly useful in observation and dominant smart home surroundings. Victimization this technique air quality are often unending monitored in home and alerts are often sent to user regarding health risks if any. Planned system conjointly improves security. User will monitor each activity in home and may management windows and doors. This technique conjointly ensures higher utilization of energy and resources through sensible

lighting, sensible appliances and sensible air-conditioning system.

V. CONCLUSION

This paper explains however the smart home mechanism is enforced. Here it's represented what physical parts it desires, the communication between them, the design of the applying and details of implementing the mentioned functionalities.

This paper a user-friendly set up for less cost and suitable home operate and monitoring system using Smartphone which operating system is android that is proposed and implemented. This application layout is communicating between the remote user and home devices. Any android phone or laptop can access or operate the home device when they are connected to the internet. Even the remote user can connect with the home devices via the mobile cellular networks when the Wi-Fi connection is not available.

Future development of this smart home resolution may be targeting additional areas. On the one hand it may integrate additional styles of intelligent appliances so as to include varied sorts of home activities. Additionally to the current, on the board device may be developed additional options for the presently additional devices. These embrace setting default scenes and themes that automatize the good appliances duties from home supported user's configurations.

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