

Smart Homes-Based On Mobile IP

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Abstract: Smart Home Using MIPv6 is the Integration of Technology and services for better quality of living. This paper provides a review of the recent Developments, Technology, Architecture, Application and future scope for Smart Homes with the tremendous help of MIPv6. The principles of MIPv6 are included for mobility on the design of the architecture for MIPv6 based Smart Homes. Smart Homes based on Mobile IPv6 Consists of various techniques and Home Networking for Interactive services. The crucial Advantages of Smart Home is to support and improve the quality of life for disabled and elderly people.

Keywords— Smart Homes,,Automation,MIP6,Internet,Security

1. INTRODUCTION

Nowdays vigorous increase in the use of computer technology in the term of devices are introduced in our society, which we use everyday. Smart Home is also a outcome of this thought with integration of technology. A boundary that defines what a Smart Home is must first be established. A Smart Home is an environment, it may be any place office, house, apartment where appliances within that environment are networked to each other by integration various technology, processors sensors. These networked appliances must aim to meet the residents basic demands on their living space. It should provide Health care, environment monitoring such as heating, ventilation, security and operation of technical equipment should be more convenient and almost invisible to the resident. This vision can also be extended where conventional devices like medicine cabinet, doors, curtains, carpets can also be made Smart included as functional pieces of Smart Home automation using MIPv6.

The first and foremost function of the Smart Home is to adapt automatically the needs of residents and provide help according to need and daily routine with greater convenience and safety and concern with energy conservation. The Smart Home growing interest due to the need to enable elder care for disabled individuals.

Smart Homes are also known as Intelligent Homes or Interactive Homes. It helps to control various Mechanical Appliances, cellular or Internet using IPv6. Smart Home Technology is a way for electronics appliances, consumers to Communicate with each other. It uses the existing technology for Smart devices by installing computers with advanced functionality using DSL, Bluetooth and wireless Technology. These technology provides the way to have a home network for devices to communicate with each other

using Internet. It is Application of Ubiquitous computing and remote access control.

We have used MIPv6 due to tremendous advantages like more efficient Routing, efficient packet processing, directed data flows, simplified network configuration, support for new services and security majors.

II. TECHNOLOGIES USED

The different Technologies that can provide platform for Smart Home Automation are X10, INSTEON, Zigbee and Z-wave.

X10 is an early home automation technology that was developed by Pico electronics of Glenrothes in Scotland back in 1975. X10 is an open protocol for communication among home automation devices that primarily uses mains wiring for signalling and control. It allows compatible products to talk to each other using the existing wiring in the Home. Most X10 compatible products are very affordable and the fact that they talk over existing wires in home means that no rewiring is required.

It is very simple, a transmitter plugs in at one location in the home and sends its control signal to a receiver which plugs into another location in the home.

X10 wired or wireless protocol packets consist of a four bit House code followed by one or more four bit Unit codes and then a four bit Command. Different House code often need to be used within the same home to generate enough distinct X10 addresses and so they are usually not available to help distinguish one X10 house installation from a neighbouring one.

Smart Home products together with X10 are Leviton, Stanley, IBM, JDS, ACT, Homepro etc.

Zigbee protocol (IEEE 802.15.4) was engineered by the ZigBee Alliance. It is a wireless communication standard based on a standard network architecture. ZigBee devices are designed to communicate via radio frequencies. It has

adopted 2.4 GHz for its world wide standard frequencies. ZigBee devices are of 3 types ,Coordinator,Routers,and End Devices.Coordinator control the network formation and security.Routers pass on the signal and extend the network range.End Devices perform specific tasks such as turning on a light.ZigBee Home Automation offers a global standard for interoperable products enabling smart homes that can control appliances,lighting,environment,energy management and security as well as expand to connect with other ZigBee networks.

Z-Wave is a mesh networking technology developed in 1999 to create a standard for wireless Radio frequency communication for home devices .

Z-Wave devices have a greater signal range. The range of a Z-Wave devices is influenced by a number of factors ,first being the presence of walls in the vicinity. Typically reported ranges are around 30 meters (90 feet) indoors and 100 meters (300 feet) in the open air.Z-Wave have excellent penetration through walls and floors and is very secure.Z-Wave products from various manufactures are interoperable.

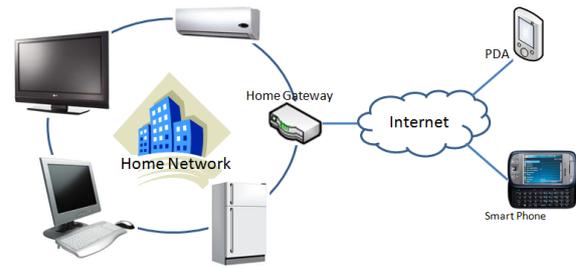
Z-Wave uses reliable wireless technology to communicate between devices.Devices can also function as repeater stations.Reliability is at the heart of Z-Wave that’s why Z-Wave devices talk to each other passing on commands and communication.Z-Wave built as a wireless mesh network,it’s responsiveness is not only fast but also reliable.It is expandable so don’t have to invest a lot of money into building a complete Home Automation system.It allow to expand the system to an unlimited amount of Z-Wave devices.

INSTEON the most reliable home automation technology is based on dual-mesh network.Dual means that INSTEON uses both radio frequency and home’s existing electrical wiring to talk to each other .Every message is confirmed as it is received and if any errors are detected,the message is automatically resent.Unlike all other mesh networks,INSTEON mesh network has every device acting as a repeater,receiving and sending devices on the network so instead of stressing the network by adding more INSTEON devices,you actually strengthen it.

INSTEON commands are simple and universal one command is sent to all devices simultaneously for instant, elegant scene control.INSTEON commands are guaranteed to be backwards and forwards compatible .Every INSTEON device has its own unique ID,so neighbours and would-be hackers can’t control your home.

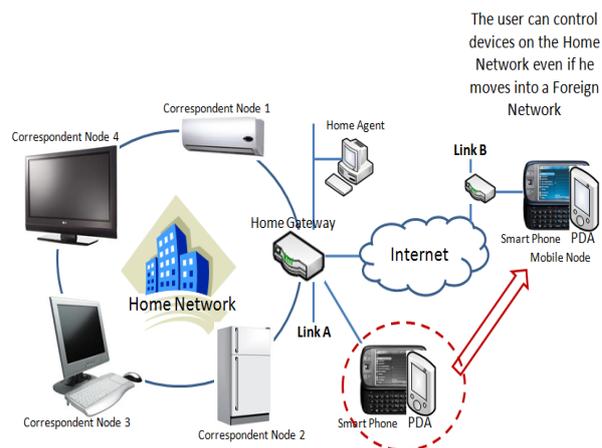
INSTEON powerline devices transmit data at 131.65 KHz and corresponding wireless devices at 904 MHz.The development and availability of interoperable INSTEON protocol products is driven by the INSTEON Alliance.

III. Architecture



Some equipments can work with a peer to peer network setup, but is not applicable to home equipments that use the same protocols.Thus,a home gateway is enabled as a service gateway ,translating between different protocols for appliances.Based on the above defined technology Smart Home can be described as an integration of technology and services through home networking for a provision of a better quality of living.The traditional setup for Smart Homes is enhanced by providing mobility utilizing the principles of MIPv6.

Design of MIPv6-based Smart Home Architecture



Above figure shows that user can still control the home appliances or equipments connected to the home network even if he moves into a foreign network.When the user is away from the home network ,the user's mobile phone or PDA is associated with a care-of-address which identifies its current location.

Mobile IPv6 is a version of mobile IP that allows users with mobile devices whose IP addresses are associated with one network to stay connected when moving to a network with a different IP address.

IV. Applications

APPLICATIONS	DESCRIPTIONS
1.Communication	Wireless communication
2.Auto Curtain	Auto open-close
3.Home Entertainment	Appliances auto on-off
4.Garage	Doors auto on-off
5.Autolighting	Lights auto on-off

6.E-cam	Auto recording
7.Home backup system	Backup stored in case of failure
8.Security	Alerts on suspicious entry
9.Auto-sprinklers	Fire put-off systems
10.Home Automation	Above applications are home automation activities.

V. EXISTING PROJECTS

Projects which are currently working in this area are General Electric Smart Hosignedme, MIT Intelligent Room,TCU Smart Home,& Microsoft easy living.

General Electric Smart Home In this project the appliances control interfaces are designed for climate control and light control functionalities. Energy management devices are also inbuilt. Security systems are also designed to avoid and alert from any unusual activity.

MIT Intelligent Room The project is based on technologies for an intelligent Room. Rather than pull people into the virtual world of computer the project is trying to pull the computer out into the real world of people. It combines robotics and vision technology with speech understanding to provide ready-at-hand computation and information services for people engaged in day-to-day activities.

TCU Smart Home This project is based smart technologies like inhabitant prediction and smart entertainment control.

Microsoft easy living The project is based on camera-based person detection and tracking of people if they pass into the room. Biometric authentication is used for valid verification.

Distributed systems are used for synchronisation of appliances which are interconnected to form a smarter technology. Ubiquitous computing is also known as pervasive computing is the result of computer technology advancing at exponential speed ,a trend towards some man-made products and some natural products having hardware and software.

III. Example

The most heard about the Smart technologies are that of kitchen appliances.Devices such as Refrigerators, Microwaves, Coffeemakers and Dish Washers will use this technology.Whenever someone wants to have a snack but does not feel like making something , why not have the refrigerator to suggest something based on what it has inside ofIt.Not only it would communicate with microwave to prepare the cooking power and Time for that particular dish.Smart Home Technology will be used in many electronics devices in the near future and it is a form of

technology that will prove to make life easier in Ways and more entertaining.Current example of Smart Refrigerator for Smart Homes are developed by LG Electronics. Intelligent Vehicles Environment which is capable of Location-aware navigation systems,task-specific navigation,traffic-awareness and Intelligent Environments which handle optimized climate and light control,item tracking and automated ordering for food and general use items,automated alarm schedules to match inhabitants preferences,control of media system etc are examples of Smart Home.

III. FUTURE SCOPE

Home Automation , Health monitoring and decision making are the main features which will be the part and parcel of near future in the smart phones.Smart Homes will contain multiple,connected devices such as: appliances;control actuators;personal health and home-environment sensors ,entertainment console and displays. Data from these devices can be exchange easily in support of a range of Smart Home services.Examples include local and remote home energy management,security monitoring,wellness monitoring and also the sharing of Internet and entertainment content.

These services make the lives of householders easier,as individuals gain finer control over there environment by accessing a variety of context and situation-aware application.

IV. CHALLENGES

There are many challenges in Smart Home Automation ,can be defined as-

Home Design and sensor Layout is a essential task to select how many and what type of sensors should be used according to Home Design.how to interpret sensor data,how to interface with sensors,are sensors active or passive.

Communication and Pervasive Computing,what medium and protocol should be used,how to handle bandwidth limitations,what structure does the communication infrastructure have with pervasive computing .

Management of available data, How to store all the data ,What data is stored ,How is data distributed to the pervasive computing. infrastructure are the challenges to maintain the Smart Homes.

Prediction and Decision Making ,How to extract and represent inhabitants task patterns , What patterns should be maintained , How to determine the actions to automate , To what level should tasks be automated are the tedious task to solve.

Automation, How are the tasks automated ,How are actuators controlled ,How is safety ensured are challenges for Smart Home Automation.

System Integration, How to achieve extensibility,Should the system b centralized or decentralized , How to integrate existing technology components , How to make integration and interface intuitive are to be handled.

Privacy,How to ensure that inhabitant information remain private,what data should be gathered,How should personal data be maintained and used are the issues that are concerned with privacy.

IV. CONCLUSION

The Idea of Smart Homes is exciting.In simple terms and Smart Phones provides superior comfort, convenience, security and energy saving through intelligent control using the electric devices, Networks and Mobile IPv6.Concluding we believe that the future in home automation using MIPv6 is towards the Internet. Web technologies have the potential to become the future standards in Smart Home environments towards an interoperable and sustainable.The goal of Smart Homes using MIPv6 is to be integrated into every facet of an individual's life,resulting in the culmination of the technology into the home environment and effectively creating a Smart Home where all user needs are anticipated and cared for .We hope that through our effort Smart Home is no longer an conceptual topic but will be applicable to anyone's home and being adopted in anyone's living style .So we can say that Smart Home is a living space saturated with computing and communication,yet gracefully integrated with human occupants and visitors. .So we can say that Smart Home is a living space saturated with computing and communication, yet gracefully integrated with human occupants and visitors.

V. REFERENCES

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