

Next Generation Intelligent Houses through MIPv6

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Abstract: Mobile IPv6 is intended to enable IPv6 nodes to move from one IP subnet to another when a mobile node is not in home network. It sends information about its existing position to a home agent and home agent intercept packets addressed to the mobile node and tends them to the mobile nodes present location. Recent research has concentrating on application in house and buildings. This paper describes how MIPv6 technology can be used in intelligent house to make them saturated with computing and communicating to express superior comfort, convenience, security and energy saving through intelligent control through the electronic device.

Keywords: Intelligent House, X10, ZigBee, Insteon, MIPv6.

1. Introduction

The Mobile IP protocol gives permission for location-independent routing of IP datagram's on the Internet. Every mobile node is identified by its home address disregarding its existing position in the Internet. When Mobile IP is not in home network, a mobile node is combined with a care-of address which locates its existing position and its home address is combined with the local endpoint of a tunnel to its home agent. Mobile IP explains how a mobile node enrolls with home agent and how home agent approaches datagram's to the mobile node through the tunnel. This technology provides the way to have a home network for devices to communicate with every other using Internet. MIPv6 has many advantages like more efficient routing, efficient packet processing, directed data flows, simplified network configuration, support for new services etc. which make it convenient to use in intelligent homes so that electrical devices can talk to Every other and they can be controlled using a remote node i.e. the user can control devices on the home network even it moves from the home network [7].

2. Intelligent House

An intelligent building arises when modern technology solutions, architecture and energy efficiency play together. The concept of intelligent buildings presents the strongest level of communication among a building's systems. The term "buildings system" refers to all the systems that operate a building like HVAC, mechanical, structural, access control, safety and security, building management. The intelligent building concept presents control and management by a building's systems and users using computer abilities to achieve users' needs, which may include productivity, efficiency, energy savings, entertainment, delight, and comfort, return investment and low life cost.



Intelligent building system should have nervous system consisting of embedded sensors and actuators that control most real time information. Accordingly, the building will have the ability to react statically and kinetically. So altering the form and maintaining building body internally and externally will be some examples of building abilities. The nervous system represents integration among all systems, so intelligent building will be liquid form that changes according to surrounded environment or/and its current mode. As humans, users should able to know if the building happy, sad, sick, or relaxing. The building on the other hand, should be able to recognize users' mode and act according to their modes [6].

3. Technologies Used In Intelligent House

The different technologies that can provide platform for intelligent house Automation are X10, INSTEON, Zigbee and Z-wave

X10 is a home automation technology that was developed by Pico Electronics of Glenrothes in Scotland back in 1975. It is an open protocol for transmission of data among home automation equipment which uses main wiring for signalling and control. It allows compatible products to communicate with every other using the present wiring in the house. X10 compatible devices are easily available and they communicate with present wiring system in house means no rewiring is required [3], [8].

Zigbee protocol (IEEE 802.15.4) was engineered by the Zigbee Alliance. Zigbee is a wireless communication standard and having standard network architecture. Zigbee devices are designed to talk via radio frequencies. It has adopted 2.4 GHz for its worldwide standard frequencies. Zigbee devices are of three types: Coordinator, Router and End Devices. Features of Coordinator are network formation and security. The Router passes the signal and increases the network range. End devices perform specific tasks such as turning a light. Zigbee home automation gives a global standard for interoperable products enabling intelligent house that can control turning on/off light, environment, energy management, security and other appliances as well expand to connect with other Zigbee networks [3], [10].

INSTEON is reliable home automation technology which is based on dual-mesh network. INSTEON works on both radio frequency and house existing wiring to communicate with every other. Every message is confirmed when it received and the message is automatically resent if the errors are detected. INSTEON mesh network has every device acting as repeater, receiving and sending devices on the network, so instead of stressing the network by adding more INSTEON devices, you can actually strengthen it.

INSTEON commands are particular, command is sent to all devices at same time, elegance scene control. INSTEON commands are guaranteed to backward and forward compatible. Every INSTEON device has its one of kind ID, so there is no issue of security for your house.

INSTEON power devices transmit data at 131.65 KHz and corresponding wireless device at 904 MHz. The development and availability to interoperable INSTEON protocol device is driven by the INSTEON Alliance [3], [9].

4. MIPv6

Mobile IP (or MIP) is an IETF standard communications protocol which permits the mobile device users to move from one sub network to other while maintaining permanent IP address. The Mobile IP protocol gives permission for location-independent routing of IP datagrams on the Internet. When Mobile IP is not in home network, a mobile node is combined with a care-of address which locates its existing position and its home address is combined with the local endpoint of a tunnel to its home agent. Mobile IP explains how a mobile node enrolls with its home agent and how the home agent shows a way datagram's to the mobile node through the tunnel. Internet using IPv6 for Intelligent House Technology is a way for electronics appliances, consumers to communicate with every other. It uses the existing technology for Smart devices by installing computers with advanced functionality using DSL, Bluetooth and wireless Technology. These technologies provide the way to have a home network for devices to communicate with every other using Internet. It is Application of Ubiquitous computing and remote access control. MIPv6 has tremendous advantages like more efficient Routing, efficient packet processing, directed data flows, simplified network configuration, support new services, security majors [1], [7].

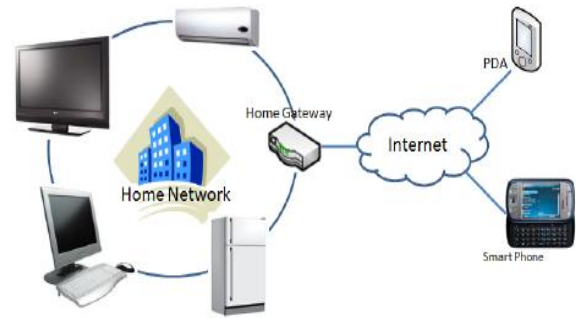


Figure 1: Architecture of a Traditional Smart Home System

Some equipment can work with a peer to peer network setup, but is not applicable to home equipments that uses same protocols. Thus, a home gateway is enabled as a service gateway, translating between different protocols for appliances. Based on above defined technology intelligent house can be described as integration of technology and services through home networking for a provision of a better quality of living. The traditional setup for Smart Home is enhanced by providing mobility utilizing the principles of MIPv6. 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 combined with a care of address which identifies its existing position [2].

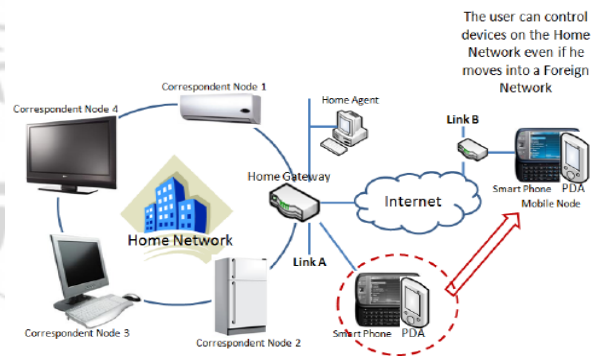


Figure 2: MIPv6 Based Intelligent House Architecture

5. Application

Here are some applications that are used in intelligent house shown below [3]:

<i>Application</i>	<i>Description</i>
1. Communication	Wireless Communication
2. Curtain	Auto open close
3. House entertainment	Appliances auto on-off
4. Garage	Doors auto on-off
5. Lightning	Lights auto on-off
6. E-camera	Auto recording
7. Security	Alerts on suspicious entry
8. House back-up system	Back up stored in case of failure
9. Auto Sprinklers	Fire put off system
10. House automation	Above applications are house automation activities



- [10] <http://en.wikipedia.org/wiki/Zigbee>
[11] <http://www.treehugger.com/gadgets/nokia-entering-smart-home-scene-with-mobile-phone-project.html>

Figure 3: Intelligent House Application

6. Conclusion

The Idea of Intelligent House 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 standard in intelligent house environment towards an interoperable and sustainable. The goal of Intelligent House through MIPv6 is to be integrated into every facet of an individual's life, resulting in the arrival of the technology into the home environment and effectively creating a Intelligent House where all user needs are anticipated and cared for. We hope that through our effort Intelligent House is no longer an conceptual topic but will be applicable to anyone's house and being adopted in anyone's living style. So we can say that Intelligent House is a living space saturated with computing and communication, yet gracefully integrated with human occupants and visitors.

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