

Secure and Efficient Protocol for Route Optimization in PMIPv6-based Smart Home IoT Networks

ABSTRACT

The communication in the Smart Home Internet of Things (SH-IoT) comprising various electronic devices and sensors is very sensitive and crucial. In addition, the key requirements of SH-IoT include channel security, handover support, mobility management, and consistent data rates. Proxy Mobile IPv6 (PMIPv6) is considered as one of the core solutions to handle extreme mobility; however, the default PMIPv6 cannot ensure performance enhancement in SH-IoT scenarios, i.e. Route Optimization (RO). The existing security protocols for PMIPv6 cannot support secure RO for SH-IoT services where Mobile Nodes (MNs) communicate with home IoT devices not belonging to their domain. Motivated by this, a secure protocol is proposed, which uses trust between PMIPv6 domain and smart home to ensure security as well as performance over the path between MNs and home IoT devices. The proposed protocol includes steps for secure RO and handover management where mutual authentication, key exchange, perfect forward secrecy, and privacy are supported. The correctness of the proposed protocol is formally analyzed using BAN-logic and AVISPA. Further, network simulations are conducted to evaluate the performance efficiency of the proposed protocol. The results show that the proposed approach is capable of providing secure transmission by resolving the RO problem in PMIPv6 along with the reduction in handover latency, end to end delay and packet loss, and enhancement in throughput and transmission rate even during the handover phase.

EXISTING SYSTEM

The evolution of new communication technologies in the electric and electronic industry gives a broader vision to control and operate various types of equipment in a home. The communication in the Smart Home Internet of Things (SH-IoT) comprising various electronic devices and sensors is very sensitive and crucial. In addition, the key requirements of SH-IoT include channel security, handover support, mobility management, and consistent data rates. Proxy Mobile IPv6

(PMIPv6) is considered as one of the core solutions to handle extreme mobility; however, the default PMIPv6 cannot ensure performance enhancement in SH-IoT scenarios, i.e. Route Optimization (RO). The existing security protocols for PMIPv6 cannot support secure RO for SH-IoT services where Mobile Nodes (MNs) communicate with home IoT devices not belonging to their domain.

DRAWBACKS

- It doesn't provide expected performance.
- It is not secured.

PROPOSED SYSTEM

In the proposed system, a secure protocol is proposed, which uses trust between PMIPv6 domain and smart home to ensure security as well as performance over the path between MNs and home IoT devices. The proposed protocol includes steps for secure RO and handover management where mutual authentication, key exchange, perfect forward secrecy, and privacy are supported. The correctness of the proposed protocol is formally analyzed using BAN-logic and AVISPA. Further, network simulations are conducted to evaluate the performance efficiency of the proposed protocol. The results show that the proposed approach is capable of providing secure transmission by resolving the RO problem in PMIPv6 along with the reduction in handover latency, end to end delay and packet loss, and enhancement in throughput and transmission rate even during the handover phase.

ADVANTAGES

- It provides security.
- Performance is enhanced.

SYSTEM REQUIREMENTS

H/W System Configuration:-

- Processor - Pentium –IV
- RAM - 4 GB (min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

S/W System Configuration:-

- Operating System : Windows 7 or 8 32 bit
- Application Server : Tomcat5.0/6.X
- Programming Language : Java
- Java Version : JDK 1.6 and above