**CONTENT**

|  |  |  |
| --- | --- | --- |
| **S.No.** | **TOPIC** | **PAGES** |
| **1.** | **INTRODUCTION** |  |
| 1.1 | Background | 9 |
| 1.2 | Motivation | 9 |
| 1.3 | Problem description and thesis questions | 10 |
| 1.4 | Goal and methodology | 10 |
| 1.5 | Structure of the thesis | 11 |
| **2** | **INTERNET VULNERABILITIES AND SECURE TECHNOLOGY** | **12** |
| 2.1 | Internet vulnerabilities | 12 |
| 2.2 | Security Technology | 13 |
| 2.3 | Related Work | 15 |
| **3.** | **MOBILE IP** | 16 |
| 3.1 | Mobile IP overview | 16 |
| 3.2 | Mobile IP Terminology | 18 |
| 3.3 | Mobile IP Functionality | 20 |
| 3.3.1 | Discovering the care of address | 21 |
| 3.3.2 | Registration the care of address | 21 |
| 3.3.3 | Tunneling to the care of address | 24 |
| **4** | **SECURITY ISSUE WITH MOBILE IP** | **28** |
| 4.1 | Introduction | 28 |
| 4.2 | Security issue with mobile IP | 28 |
| 4.2.1 | A denial of service attack | 28 |
| 4.2.2 | Passive Eavesdropping | 30 |
| 4.2.3 | Reply Attack | 30 |
| 4.2.4 | Session Stealing | 31 |
| 4.2.5 | Tunnel Spoofing | 32 |
| 4.3 | Security Models | 32 |
| 4.3.1 | Weak security approach | 32 |
| 4.3.2 | Strong security approach | 32 |
| 4.4 | Security improvements of mobile IP | 33 |
| 4.4.1 | Using tunneling instead of security routing | 33 |
| 4.4.2 | Avoiding route optimization | 33 |
| 4.4.3 | Using firewall | 33 |
| 4.4.4 | Implementing IPSEC as a solution to secure mobile IP | 34 |
| **5** | **IPSEC with mobile IP** | **35** |
| 5.1 | IPSEC overview | 35 |
| 5.2 | IPSEC components | 35 |
| 5.3 | Security association | 36 |
| 5.4 | IPSEC modes | 38 |
| 5.5 | IPSEC technologies | 39 |
| 5.5.1 | Authentication header protocol | 39 |
| 5.5.2 | Encapsulating security payload | 40 |
| 5.5.3 | Internet key exchange | 42 |
| 5.5.4 | Diffie – Hellman | 43 |
| 5.6 | Use IPSEC in mobile IP | 44 |
| 5.6.1 | SECMIP secured mobile IP implementation | 45 |
| 5.6.2 | SECMIP operations | 46 |
| **6** | **MOBILE IP V6** | **51** |
| 6.1 | Mobile IP v6 overview | 51 |
| 6.2 | Differences between MIP v4 and MIP v6 | 53 |
| 6.3 | Mobile IP v6 security threats | 54 |
| 6.4 | Securing binding updates | 54 |
| 6.5 | Summary | 55 |
| **7** | **DISCUSSION** | **55** |
| **8** | **CONCLUSIONS AND SUGGESTION TO FUTURE WORKS** | **59** |
| **9** | **REFERENCES** | **60** |