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Fast access selection and fast authentication analysis of IEEE mechanisms

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Executive summary / Internal release

Title: Fast access selection and fast authentication analysis of IEEE mechanisms

<Ingress text: short statement of the result/deliverable/achievement>.

Content: The authors describe and carefully analyze the existing 802.11 WLAN architectures and propose solutions that could possibly face the challenge of reducing the time spent during the link setup. For further testing and evaluation of the fast access selection a WLAN testbed (in enterprise mode) is described as well in details.

Impact: the report contributes to the IEEE 802.11 TGai taskgroup in the sense that some of the described proposals were presented there and taken into account for further study.

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Link: www.cs.helsinki.fi/u/gurtov/papers/Georgantas-thesis-for-archive.pdf

1 Introduction

Fast Initial Authentication (FIA) is what mobile stations need in order to merge in real mobile services. The cost of it seems really low as it does not include hardware changes but only some modifications of the 802.11 standard which can possibly be integrated to or form a new amendment of the existing standard. Reducing the time of the initial host authentication is the main goal of this work.

There are a lot of scenarios that FIA could possibly improve or even satisfy. As mentioned in the previous section, FIA can offer better mobility and that is why all of the use cases refer to mobile services. The use cases can be divided in two main categories; vehicular and non-vehicular. STAs' speed and density and the AP coverage are three important factors that aect the communication's QoS.

There are different ways of dealing with this challenge. The most of them enhance the current IEEE 802.11 based authentication mechanism by reducing the exchanged messages or by piggybacking upper layer information during the authentication phase. That is why before dealing with the problem of FIA there is a need of detailed understanding of the IEEE 802.11 standard and especially its message exchanges. However before starting this thesis project there was a suggestion that the Host Identity Protocol (HIP) could help reducing radically the message exchanges. So in this report there will also be an initial proposal of how HIP can be integrated in the 802.11 standard as an authentication mechanism as well as a suggestion of a new mobility friendly WLAN architecture which could possibly prove to be useful in the above described use cases.

Moreover, on the implementation part, the code related to the IEEE 802.11 standard is vast. Hence, there will be an extraction of the authentication related code, an analysis of it and at last an attempt for a FIA proposal implementation. For testing and educational purposes it will be also interesting to see how an AP and a mobile STA are set up in a WLAN.