

Distributed User Authentication in Wireless LANs

Dmitriy Kuptsov, Andrey Khurri and Andrei Gurtov

{dmitriy.kuptsov,andrey.khurri,gurtov}@hiit.fi

www.hiit.fi/netwr

Motivation

Increasing use of WLANs with user authentication as a prerequisite

- Existing mechanisms:
 - Often NO security at all
 - Login information via a web page
 - Needs periodical re-entering
 - Some Wi-Fi devices actually miss a display or a browser



- Architectural (HIT registration, ACL, rule clustering)
- Development (migration to other platforms, cross-compiling, bugs)
- Performance (limited resources of Wi-Fi access routers)
- Deployment (HIP-enabled mobile clients)

Manual tuning of WPA keys

- Not straightforward for end-users
- WPA TKIP has been shown to be breakable
- Do not solve any additional problems, e.g. mobility

Design objectives

- Disruption-free user authentication
- Protection from external attacks
- Host mobility and multihoming
- Data integrity and confidentiality

Distributed authentication model



Performance in firewall mode



Summary from experiments

Two-level approach preferred:

- HIP-aware FW on access points
- HIP proxy on a central server
- Lightweight (La Fonera-like) ARs are only suitable for
 - Small number of connections

First-time registration (HIT $\leftarrow \rightarrow$ Identity) HIT-based filtering Rules in Access Control List (ACL) ■ACL synchronization between all firewalls Clustering and sorting the rules

Benefits

Client authentication in a distributed manner (irrespective of location)

First-time registration only

Support of mobility

Secure tunnel over wireless link, IPsec data encryption

Incremental deployment

HIT-based filtering Advanced (Gateworks Cambria-like) ARs are required for Large scale networks

Both HIP FW and HIP proxy on AP



Kuptsov D., Khurri A., Gurtov, A. Distributed User Authentication in Wireless LANs. In Proc. of the 10th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM'09). 15-19 June 2009, Kos, Greece. IEEE.

Helsinki Institute for Information Technology HIIT is a joint research institute of Aalto University and the University of Helsinki for basic and applied research on information technology.





Aalto University

UNIVERSITY OF HELSINK