Network Selection for Public WLANS

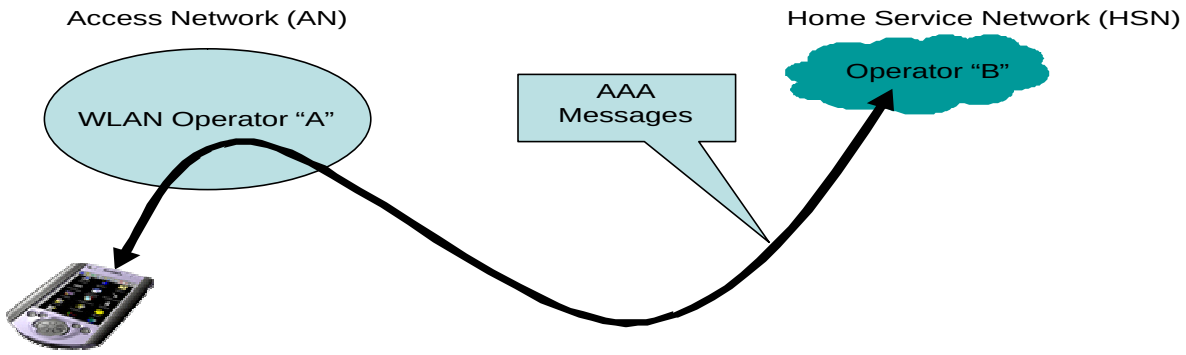
Farid Adrangi – Intel Corp.

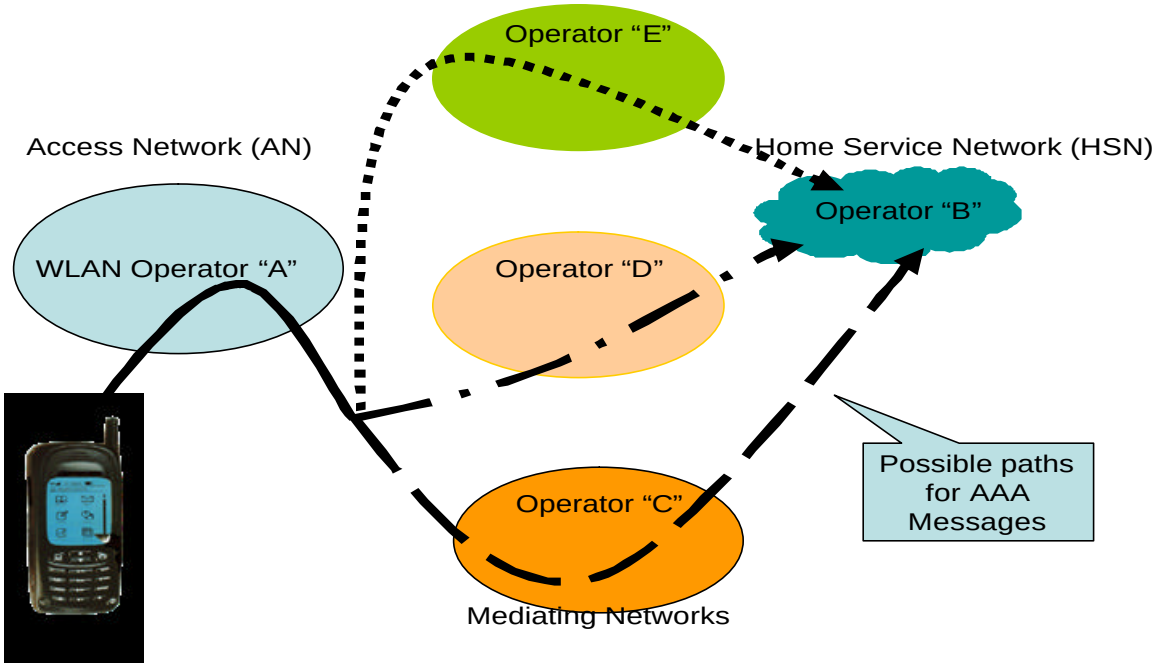
Farooq Bari – AT&T Wireless

Background

- An increasing public WLAN deployment by WISP, 3G, and fixed broadband operators
- In roaming situations, a WLAN access network may have roaming relationship with
  - Several subscriber's home networks
  - Several mediating networks, roaming consortiums and brokers, or both
- A subscriber's home network may have roaming relationships with several mediating networks.

Roaming Scenarios





Public WLAN Use Cases

- Use case 1 - *WLAN client moves into a Hotspot advertising the client's HSN SSID*
- Use case 2 - *WLAN client moves into a Hotspot advertising one or more of WLAN client's HSN Roaming Partner SSID(s) but not its HSN SSID*
- Use case 3 - *WLAN client moves into a Hotspot advertising only Unrecognized SSIDs*

HSN : Home Service Network

Problem Statement

1. Access Network Discovery & Selection
   - Which SSID to attach to?

2. Mediating Network Discovery & Selection
   - How to route the AAA conversation to the home network?

The paper focuses on solving problem #2

Solution Alternatives

- Beacon Based / Layer 2 Mechanisms
  - Beacon extension to carry network information
  - Multiple SSID advertisement (Virtual AP)
- EAP Signaling / Layer 2.5 Mechanisms with NAI decoration
  - Independent of underlying link layer

Comparison

Comparison Criteria	*Beacon-based Mechanisms*	*EAP-based Mechanisms*
Ease of Deployment & Ease of Operations	Requires configuration and provisioning on a large number of APs	No impacts on currently deployed APs
Minimal impact on performance of radio bandwidth	Consume radio bandwidth as the information is broadcasted frequently	The impact is lesser on radio bandwidth as the WLAN Roaming Partner information is only advertised when requested
Minimal Latency	This mechanism is faster than the EAP mechanisms since association to Access Point is not needed to discover the Roaming Partners of the WLAN Operator.	This mechanisms is slower relative to Beacon-based mechanisms, since WLAN client has to associate to an Access Point before it can discover Roaming Partners of the WLAN Operator
No impact on current IEEE or IETF standards	Possible impact on IEEE 802.11 standards	No impact
Backward compatibility with current infrastructure	Beacon-based mechanisms can impact currently deployed APs	EAP-based mechanisms will require an update of AAA proxy in the WLAN

Pros

Cons

Put it all together

- Client attempts to directly authenticate to its home network based on
  - Available SSID list (obtained through 802.11 scanning)
  - Preferred SSID list (provided and provisioned by the home operator)

- Client attempts to authenticate to his home network via an intermediary base on
  - Available intermediary network list (Obtained through EAP signaling)
  - Preferred intermediary network list (provided and provisioned by the home operator)
  - Use of NAI decoration

Related work

- IETF
  - Problem Statement
    - http://www.ietf.org/internet-drafts/draft-ietf-eap-netsel-problem-01.txt
    - http://www.ietf.org/internet-drafts/draft-ietf-roamops-2486bis-01.txt
  - Identity Selection hint
    - http://www.ietf.org/internet-drafts/draft-adrangi-eap-network-discovery-02.txt
- IEEE
  - WIEN (Wireless Interworking with External Networks)
    - Network Detection & Selection, Beacon scalability, 3G keying issues, Policy enforcement, traffic enforcement, charging, etc
- 3GPP Release 6 / GSMA IR61
  - AAA routing (based on EAP signaling)
  - Payload routing

Questions?

Backup …

AAA - Public WLAN Infrastructure