

"Measurement Module for mobility management in WLAN networks"

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There is an ongoing work in IETF related to the development of protocols for support of mobility in IP networks. There also exist a number of proposals to enhance handover of a mobile terminal in order to achieve optimized performance in terms of latency or packet loss.

In addition to that there also exist some concepts for protocols to facilitate management of wireless access networks. These solutions differ in the extent in which accuracy, scalability and performance are accounted for. Some of those concepts target specific network technology while others are technology-independent.

The Forced Handover Protocol (ForeHand) is a protocol for managing mobility of terminals by means of *network-initiated* and *network-controlled* handover process. It is being developed in Terminal Mobility Track of Daidalos Integrated Project ¹.

Together with Performance Manager and QoS Broker the ForeHand protocol allows to apply various criteria and strategies that reflect operator needs in terms of resource allocation and usage, as well as different policies to deploy services with different requirements. The protocol represents a network-oriented approach in which the decision about a handover of a mobile node (handover preparation) and control over the process (handover execution) originates in the network.

The protocol provides an added value in terms of strict control over the network resources and allows to enforce usage patterns in the radio access network. The first application area for the protocol is a Wireless LAN (WLAN) network, but the protocol is supposed to be used in the project also for other technologies.

A front-end part of the protocol is **the Measurement Module** located in radio access point. It is supposed to monitor activity of mobile nodes and quality of the radio links from mobile nodes that remain within coverage area of a radio access network. It is also responsible for control over association and reassociation of mobile terminals, pre-processing of the resulting measurement information and delivery of filtered output to measurement information aggregation points in Access Routers. When the module encounters severe signal-strength degradation on a link from MN to access point, it sends a trigger for handover of that terminal.

The following measurement-based parameters are supported by the protocol:

1. MAC
2. Time
3. Channel
4. Power level
5. Noise level
6. Access Point Mode or Mobile Node Mode
7. SSID
8. Mobile Node activity
9. Frame error rate
10. Identifier of a radio access point
11. Beacon interval

The demonstrator shows real-time signal-strength measurements and current rate for Mobile Nodes that are within radio coverage of access network.

A textual representation of graphical interfaces is the following:

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Legend: UT      - unit type, AP=access point, MT=mobile node, MAC  - MAC address,
RT             - Current Rate [Mbits/s], 1..11 - radio channels
UT|MAC|RT|1|2|3|4|5|6|7|8|9|10|11|
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
AP|00:0d:54:a9:42:7a|10|180|177|174| | | | | | | | | | | |
AP|00:06:25:2b:26:94|20| | | | | | | | | | | | | | | |
AP|00:0d:54:a9:42:64|10| | | | | | | | | | | | | | | |
AP|00:06:25:2b:2d:21|20|179| | | | | | | | | | | | | | |
MT|00:0f:24:ad:3a:11|10|179|180| | | | | | | | | | | | |
MT|00:02:b3:0a:d3:bf|10|178| | | | | | | | | | | | | | |
MT|00:0f:24:ad:3a:12|10| | | | | | | | | | | | | | | |
MT|00:0d:54:99:4e:91|10|175| | | | | | | | | | | | | | |
MT|08:00:09:aa:6e:14|10|178|178| | | | | | | | | | | | |
MT|00:0c:6e:e8:13:5b|10|177|177| | | | | | | | | | | | |
MT|00:90:27:14:4c:ed|10| | | | | | | | | | | | | | | |
MT|00:02:b3:21:1a:c2|10| | | | | | | | | | | | | | | |
MT|00:0e:a6:a2:68:e7|10| | | | | | | | | | | | | | | |
MT|00:0e:a6:a2:69:b7|10|178| | | | | | | | | | | | | | |
MT|00:10:a4:7a:e4:97|10| | | | | | | | | | | | | | | |
MT|00:c0:b7:c9:be:e9|10| | | | | | | | | | | | | | | |
MT|00:02:b3:48:c8:0c|10|178| | | | | | | | | | | | | | |
MT|00:0c:6e:e8:12:cc|10| | | | | | | | | | | | | | | |
MT|00:00:21:ff:c0:b0|10| | | | | | | | | | | | | | | |
MT|00:e0:18:bb:e8:42|10|178| | | | | | | | | | | | | | |
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¹ DAIDALOS, Designing Advanced Interfaces for the Delivery and Administration of Location independent Optimised personal Services – Contract No. 506997, Strategic Objective 2.3.1.4: “Mobile and wireless systems beyond 3G”