

## D5.3 – Phase I Experimental validation – Emulations Executive Summary

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### Abstract:

**This deliverable describes emulations carried out to validate the Phase I components and architecture of the MobiThin project. These emulations include the optimization of the wireless last hop, as well as the evaluation of the user management and the session migration subsystems.**

**This deliverable comes in parallel with D5.4, describing the validation work carried out based on lab-trials.**

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The **MOBITHIN Project Consortium** groups the following Organizations:

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# 1. EXECUTIVE SUMMARY

This report, together with its accompanying deliverable 5.4, brings together the validation results obtained in the first project phase of MobiThin. The results addressed are emulation based, i.e. validation work where some of the actually intended hardware is replaced by an emulated equivalent. The results presented related to the optimization of the wireless link (focusing on the evaluation of a novel cross layer optimization approach, both of energy efficiency and QoS parameters (delay and jitter), and the session migration and user management subsystems of the service management framework.

For the wireless link optimization w.r.t. thin client traffic, it is shown that:

- important energy savings can be obtained, especially in relatively poor network conditions (high congestion and high path loss). Results up to 75% of energy savings are obtained in the case of 80dB path loss and 12 Mbps background traffic for a WiFi 802.11g network.
- delay and jitter penalties, intrinsically incurred by the cross layer approach, are low for all cases considered, and are most probably negligible for any practical situation

These encouraging results motivate similar experiments on different network technologies, in the presence of QoS mechanisms.

The session migration subsystem has been implemented according to the architecture and interfaces specified in earlier documents. In addition, first algorithms for server selection and migration initiation have been implemented, in order to assess the performance of this subsystem in practice. The approach taken follows the MAPE-strategy (Monitor-Analyse-Plan-Execute), where the monitoring input has been made SNMP-compatible (alarms are sent to the session migration system through SNMP trap messages). Performance results on commodity server hardware, show that up to 700 alerts can be handled (within a response time of 4ms). Relating this throughput to the number of alerts per user expected per unit of time, indicates that the scaling up to beyond 2 million users per session migration server is certainly possible.

Also the user management subsystem has been realized according to the architecture and interfaces defined in the MobiThin design documents, ensuring the availability of necessary functions to efficiently manage the user base of the thin client service. This entails the implementation of authorization and authentication modules, as well as connection and session set-up components. An assessment on perceived delay to set up a connection and a session was made, together with a breakdown of this delay to the individual component level. When deployed on commodity server hardware, the system offers a connection setup time below 200ms and a session setup time below 1700ms (the latter value highly dominated by the startup of the session on the actual thin client server, which is beyond the reach of the user management subsystem). These values are assessed adequate to satisfy user's expectations.

The results obtained on emulation experiments indicate that the approach taken allows satisfying the basic requirements, as formulated in the requirements document of the project (D2.1).