

# Experimental Testing in the Future Internet PERIMETER Project

Eileen Dillon<sup>1</sup>, Gemma Power<sup>1</sup> and Frances Cleary Grant<sup>1</sup>

<sup>1</sup>Telecommunications Software and Systems Group, Waterford Institute of Technology,  
Cork Road, Ireland

<sup>1</sup>{edillon, gpower, fcleary}@tssg.org

**Abstract.** This submission will provide interested parties with the opportunity to learn more about the FP7 PERIMETER project. Details of the testing and experimental methodologies and the role of testbed activities involved in this Quality of Experience network mobility project will be given. A demonstration and explanation of the Quality of Experience management system of PERIMETER will be provided and will allow visitors to interact with the system using a Google Android device with the PERIMETER middleware installed. This will be illustrated with the aid of the purpose built PERIMETER Visualisation Tool.

**Keywords:** Future Internet, Testbeds, Experimental Testing and Methodologies, PERIMETER, Demonstration.

## 1 Introduction

This submission accompanies the PERIMETER FIS paper [1] which examines the requirements and challenges of the Future Internet and demonstrates how they are dealt with in the Telecommunications Software & Systems Group research centre using a case study of the Future Internet project; PERIMETER [2]. This submission will provide a demonstration, poster and explanation of the PERIMETER middleware. Here, an overview of the PERIMETER project is provided before a description of the demonstration is given.

## 2 PERIMETER Overview

The PERIMETER project [2] entitled “User-Centric paradigm for Seamless Mobility in Future Internet” is a three-year project funded by the FP7 programme. PERIMETER is listed as one of eight ‘Experimentally driven advanced research’ projects in the first wave of the FIRE Initiative [3].

PERIMETER’s main objective is to establish a new paradigm of user centricity for advanced networking. Putting the user in the centre rather than the operator enables the user to control their identity and preferences (e.g. cost, security, network

selection). This enables the mobile user to be “Always Best Connected” (ABC) in multiple-access multiple-operator networks of the Future Internet.

To achieve this, PERIMETER develops and implements protocols and a middleware to address requirements for privacy, security, resilience and transparency. The network selection is done based upon a parameter called Quality of Experience (QoE) [4]. Analysis of QoE parameters allows the evaluation of network connections by user perceivable indexes and parameters (i.e. cost, security, connection performance). Network selection can be handled automatically by PERIMETER’s QoE management system for generic QoE definition, QoE signalling, and QoE based content adaptation [5], thus creating a single-sign-in experience.

The architecture of PERIMETER consists of Terminal Nodes and Support Nodes. The PERIMETER Terminal Nodes are users’ handheld devices which have some storage and computational restrictions. Currently mobile phones and netbooks based upon Google’s Android platform [6] are supported. The Support Nodes are physical devices that can act as data sources and gateways and are connected using a peer-to-peer approach both to other PERIMETER Support Nodes and PERIMETER Terminal Nodes. The Support Nodes do not have any storage or computational restrictions and are therefore used as the main storage for the system and for expensive computational activities. The Support Nodes reside in PERIMETER’s state of the art federated QoE testbed between Waterford Institute of Technology, Ireland and Technical University of Berlin, Germany while the Terminal Nodes are connected wirelessly to the federated testbed infrastructure [7]. The PERIMETER system is supported by a number of identified applications which also run across the federated testbed and support the verification of the user centric scenario based approach adopted in the PERIMETER project.

### **3 PERIMETER Demonstration**

The PERIMETER demonstration will encompass the QoE management system aspect of the PERIMETER middleware. This will be showcased using a purpose built PERIMETER Visualisation Tool (PVT). The PVT will demonstrate the internal functionality of the PERIMETER middleware from the users’ perspective in a graphical manner, making it intuitive for visitors to the stand. Visitors will be given the opportunity to interact with PERIMETER using Google Android handheld devices with the PERIMETER middleware pre-installed, as depicted in Figure 1. The demonstration will be supported by information on the system and an accompanying poster.

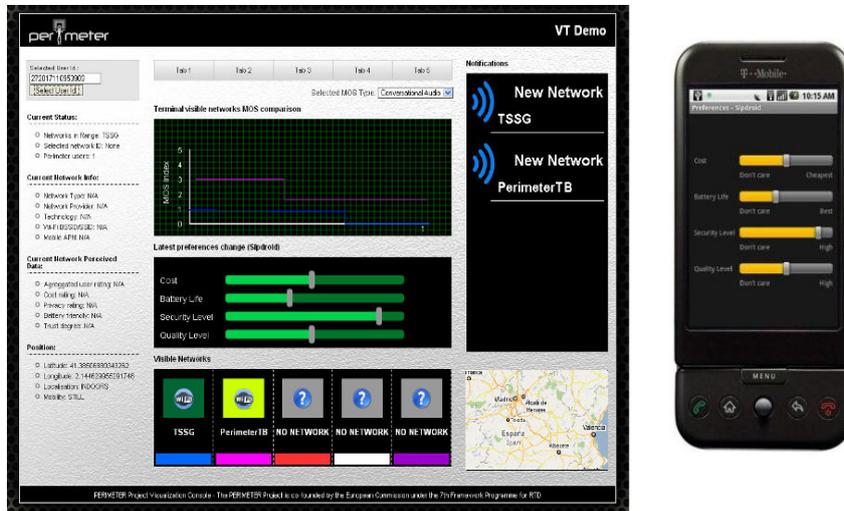


Figure 1 PERIMETER Visualisation Tool and on the Android G1 Device

## 4 Summary

This submission provides the opportunity for interested parties to learn more about the PERIMETER system, to see a demonstration of the QoE management system aspect of the PERIMETER middleware, and to provide their feedback and comments. **Acknowledgments.** This research activity is funded under the EU ICT FP7 project, PERIMETER (Project No.: 224024).

## References

1. E. Dillon, G. Power and F. Cleary Grant. Experimental Testing in the Future Internet PERIMETER Project. FIS 2010 [accepted].
2. PERIMETER, User-centric Paradigm for Seamless Mobility in Future Internet, Available: <http://www.ict-perimeter.eu/>
3. The Future Internet Research and Experimentation (FIRE) Initiative, Available: <http://cordis.europa.eu/fp7/ict/fire/>
4. DSL Forum Technical Report TR-126, Triple-play Services Quality of Experience (QoE) Requirements, December 2006, Produced by Architecture & Transport Working Group.
5. E. Dillon, G. Power, M. O. Ramos, M. A. Callejo Rodriguez, J. R. Argente, M. Fiedler, D. S. Tonesi, PERIMETER: A Quality of Experience Framework, Future Internet Symposium (FIS) 2009, Berlin (Germany), Sep. 1-3 2009.
6. Google Android Operating System, Available <http://www.android.com/>
7. F. Cleary Grant, E. Dillon, G. Power, T. Kaschwig, A. Cihat Toker, and C. Hammerle, QoE Testbed Infrastructure and Services: Enriching the End User's Experience, TridentCom, May 2010.