

# **Web-based toolkit for performance simulation and analysis of power line communication networks**

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## **Abstract-**

**AMIs (Advanced Metering Infrastructures) present an important role in Smart City environments, especially from the point of view of distribution and customers, offering control and monitoring capabilities. The use of PLC (Power Line Communication) technology offers a wide range of advantages in AMI, including not needing to deploy an additional communication infrastructure. However, the electrical network was not initially designed for communications, as these networks pose problems depending on the connected loads, such as network impedance variation, frequency selectivity or noise. For this reason, the use of simulators is proposed to facilitate the deployments based on PLC networks, and analysis and diagnosis tools for the identification of problems in operating networks are also required. This paper presents a toolkit for evaluating and analyzing the performance of PLC networks. This toolkit is composed of SimPRIME, a simulator for the evaluation of NB-PLC PRIME (Power line Intelligent Metering Evolution) networks's performance; SimBPL, a simulator for the evaluation of MV-BPL (Broadband Power Line over Medium Voltage) cells's performance; and PRIME Analytics, a forensics tool that allows diagnosis of communication problems in PRIME operational networks based on traffic traces. The toolkit has been developed throughout several research projects in close collaboration with DSOs (Distribution System Operators) and equipment manufacturers, so they provide solutions to actual problems of these industry key players and have been adapted to facilitate their use. As a result, the tools are accessible through web applications to increase their usability, portability, and scalability. These applications represent the first steps in offering PLC simulation and analysis as a service that could benefit the research community, academia, and industry.**

**Index Terms-** power line communications; power line intelligent metering evolution; simulations; traffic analysis; web applications

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