

Title: *CONTRIBUTIONS TO THE MANAGEMENT OF LOCAL AND PERSONAL AREA NETWORKS*

Author: *Eng. Cristian Mihai Vancea*

Supervisor: *Prof. Virgil DOBROTA, Ph.D.*

When this thesis research started, local computer networks used a centralized management based on SNMP protocol. The evolution of telecommunications networks has brought to the foreground other architectures such as TMN and CMIP, but these seem to have lost the "battle" for supremacy with SNMP. In addition other networks types appeared such as WPAN, WLAN, WAN, MAN, WMAN who questioned whether SNMP can be generalized. The thesis aims is to investigate the possibilities to implement SNMP in any local area network and personal technology regardless of the type of layer 1 and 2. During the research new concepts have emerged such as distributed management, integrated and intrinsic management. That why the thesis aims was to further demonstrate that once SNMP was generalized, we can move to the next phase, namely the integrated management. Both hardware and software solutions were studied including technologies that did not have default support for SNMP (e.g. IEEE 802.15.4).

We wanted to demonstrate that for the technologies: IEEE 802.3 (LAN), IEEE 801.22 (WLAN) and IEEE 802.15.4 (WPAN), the protocol proposed by IETF can be generalized. In the last part of the thesis the aims was to demonstrate the steps required for integration of the management into existing hardware and software applications. As a case study platform Asterisk was chosen, an IP PBX to which all the interfaces studied were connected. Note that the thesis has not proposed to study technologies WAN, MAN and WMAN.

The contributions to the management of local and personal networks contained in the thesis are:

- Implementing a hardware SNMP agent for IEEE 802.3.
- Implementing a hardware SNMP agent for IEEE 802.15.4.
- Realization of MIB for IEEE 802.15.4.
- Implementing a software SNMP agent for IEEE 802.11
- Realization of MIB for IEEE 802.11.
- Extension of software SNMP agent for Asterisk
- Realization of MIB for Asterisk.
- Proposed transition to the integrated management

The extended doctoral research phase imposed reorientation of the thesis towards new concepts (distributed integrated/inherent management) along with the new technologies developed in recent years. The particular interest on this issue is proven by including the topic as a priority in international research projects, such as FP7-4WARD (pronounced like the word "Forward") is entitled "Architecture and Design for the Future Internet". This is an example of project responding to the challenges of tomorrow's Internet. The current network architectures allow innovations only at the applications level, but on the other hand radical changes in the structure and the principles are required. 4WARD does not aim to create evolutionary solutions but to **redesign the philosophy of the entire Internet**, from the growing requirements for mobility and wireless access. Several types of networks will coexist on a common platform on which virtualization plays an essential role. Networks must be self-managing (see In-Network Management concept) and applications must be focused on information objects rather than network nodes. The solutions will include all types of networks, from those based on optical fiber, to wireless and sensor networks.