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Proposal for Hybrid Communication in Local Networks

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In the last decades there have been great evolutions of the applications that use the TCP/IP architecture. It is perceptible that such applications need more quality in the communication, whether through little data loss, reliability or even velocity. However, this architecture's evolution (proposed in the 70's) did not follow the same proportion so that there have not been expressive improvements in the intermediate layers, only adaptations through the years.

Given the possibility of improvements, a new model of communication is proposed, simplified, capable to attend the real applications need and in order to reduce the TCP/IP architecture protocols complexity [1]. The new structure named FINLAN (Fast Integration of Network Layers), proposes a direct communication among the link and application layers eliminating the network and transport layers protocols of the actual architecture (Figure 1).

This proposal of optimizing the communication structure in local area networks does not have the goal of eliminating the TCP/IP architecture, but to become it hybrid when related to the FINLAN, in other words it intends that the protocols stacks coexist during the implementations in the Operational System (OS) level.

	TCP/IP	FINLAN
5	Application (FTP, HTTP, SMTP, etc.)	Application
4	Transport (TCP, UDP, SCTP, etc.)	
3	Network (IP)	
2	Link (Ethernet)	Link (Ethernet)
1	Physical	Physical

Figure 1. Comparison between the protocol stacks

Project of a hybrid structure

As the proposal of layers structure does not have the goal of eliminating the use of TCP/IP protocols, but to become the Ethernet packages hybrids, the need of contemplating the implementation in the OS level with a structure that can deal with not only the IP packages, but also the FINLAN is intrinsic.

This structure becomes necessary with the comprehension that even in a local area network it is not possible to guarantee that all hosts use the FINLAN structure. For this reason, it is necessary the establishment of communication through protocols as the TCP/IP layers structure. Besides the support's implementation to the hybrid structure allows an application to communicate with FINLAN or TCP/IP according to the user/developer convenience.

The Figure 2 shows a scheme representing such structure. It is possible to observe that two elements are considered, they will do the selection of the packages according to the protocol in use. The first one, called “Packet Manager”, is responsible for directing the setting up of the package according with the application layer solicitation, which will inform the transport layer protocol or will inform if the package should be delivered to the FINLAN stack. The other element, named “Packet Director”, works when it receives a package and its function is to verify if the package is using the FINLAN structure, in this case such package will be delivered to the FINLAN stack, otherwise it will be sent to the OS standard flow.

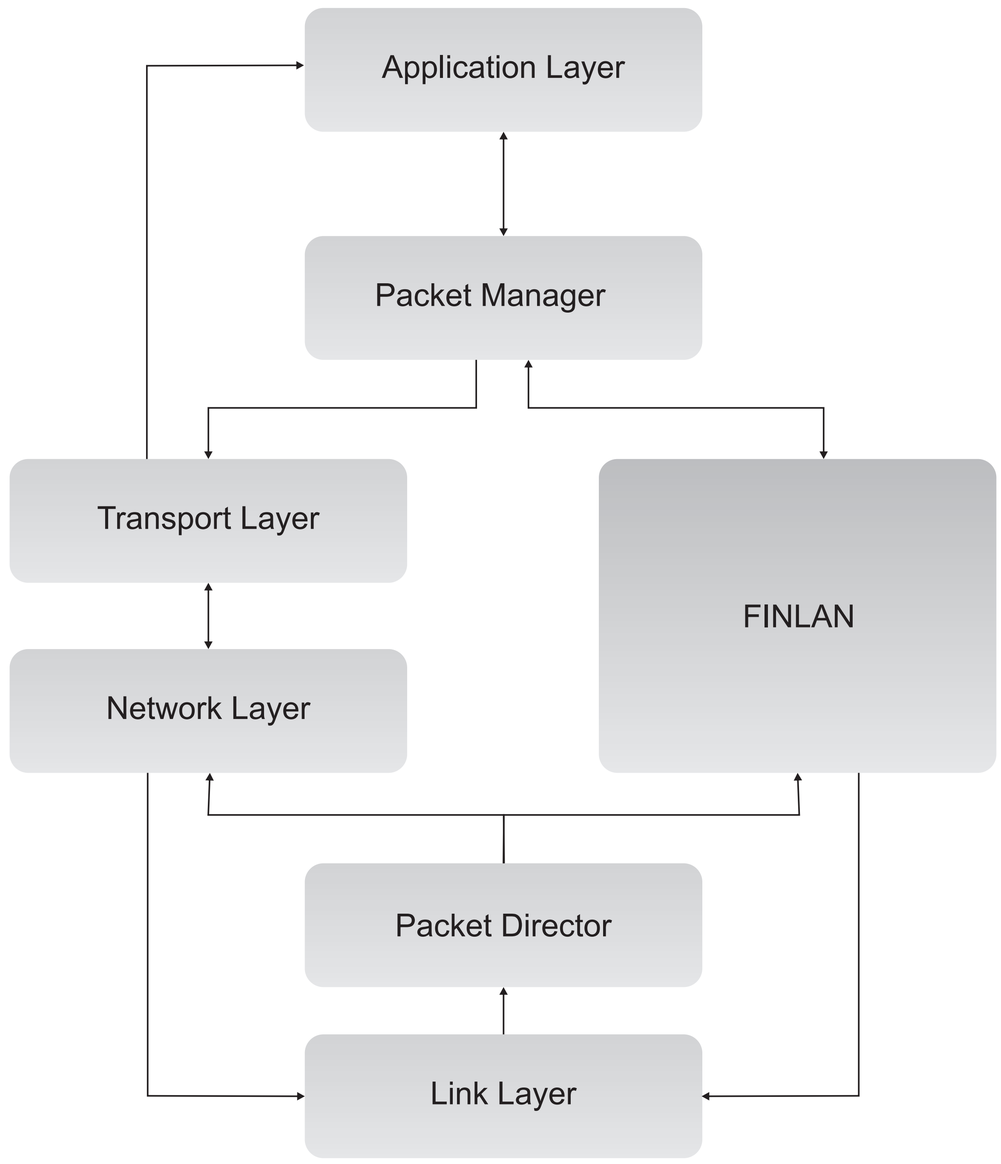

Figure 2. Scheme of Hybrid Structure

It is important to inform that the previous scheme is a proposal for the implementation of one of the FINLAN structure modules which is now in the initial stage of development. After the validation of this model, it is intended to focus on the development of delivery guarantee algorithms and on the confirmation of packages for this new technology, that fits on the next generation Internet studies [2-5].

References

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