Proactive Network Management Using Remote Monitoring and Artificial Intelligence Techniques


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Abstract

This work describes the effort to join two different approaches about the development of the Proactive Network Management. The first approach was developed in the Laboratory of Network and Management, at Federal University of Santa Catarina [2][3][4], which uses remote monitoring and simulation tools. And the second one was developed in the National Supercomputing Center [9][10], which handles the problem with artificial intelligence and SunNet Manager’s agents usage. The new concept of proactive network management aims at identifying the existing troubles in advance to any performance degradation, as well as providing support for future decision-making actions. The goal of this work is adapting a complete proactive environment which will be use to explore the remote monitors and simulation tools to identify symptoms of proactive management problems. And specially to recognize a problem using artificial intelligence techniques and take proactive actions to solve it, configuring a proactive management application for the prevention of problems in computer networks.

1. Introduction

At present, a new concept for network management is being researched. Proactive management concept enables to identify the existing troubles in advance to any performance degradation, as well as provides support for future decision-making actions. Proactive management aims at maintaining the quality of the offered services at a desirable level, improving the overall network performance [6]. Therefore, organizations will decrease their investments in fault recoveries, and as a consequence save time and gain a more efficient control over resource usage. Moreover, the proactive network management provides a description of the network behavior allowing the creation of a network profile which is statistically correct. Hence, the proactive methodology aims at reducing managerial work in recovering faults that may damage the network performance. Normally, the task of management begins after the already existent performance degradation. Management systems are frequently designed for emitting alarms and for notifying current and presently arising events [5]. This activity is called reactive methodology. On the contrary, proactive management provides system variable pre-search in advance to the service degradation of management applications. Therefore, this paper presents a strategy to join two different implementations of proactive management in computer networks. The first was developed at Federal University of Santa Catarina, and uses the remote monitoring and simulation tools to adapt the proactive concept. The second approach, was developed in the National Supercomputing Center, which handles the problem with artificial intelligence techniques and SunNet Manager’s agents usage. The goal of this join is establishing a complete environment to test the viability of the proactive network management, especially about the performance aspect.

This work is organized in six sections, Section 2 describes some aspects about the proactive management concept. Section 3 presents the model proposed to implement the proactive management with artificial intelligence. While the test environment and the requirements to implementation of a prototype are described in Section 4. Some results and preliminary tests are disposed in Section 5. Finally, the conclusion and future works will be presented.

2. Proactive network management

As mentioned, the new concept of proactive management must identifying the possible troubles in advance to any performance degradation. For this however, the network behavior must be analyzed to assist