Analysis of the Current State of Self-healing Systems

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***Abstract.** Recently, growing interest in the class of so-called self-healing systems. As you know, if the maintenance of the IT infrastructure of the enterprise is associated with the maintenance of only a few servers and a pair of switches, then usually everything works well and with manual control. However, when the number of servers grows and begins to be calculated by tens, some of them have to be temporarily suspended for periods of downtime, the service becomes a complex process. The search for acceptable solutions forced the market to "remember" the technology of autonomous computing (autonomic computing). The process of introduction of tools of autonomics calculations into IT system, realizing the mechanism of self-regulation with a possibility of self-restoration of the initial condition existing before the beginning of disturbances is considered.*

***Keywords:** Self-healing systems, autonomic computing, autonomic computing systems, autonomic computing model, self-updating of IT systems, IT infrastructure of the enterprise.*

I. INTRODUCTION

In modern conditions of functioning of human life services, an important factor is the round-the-clock automatic monitoring of various systems and a quick mechanism for their recovery, which can constantly maintain the availability of various functions and services offered to the client. Modern software systems are by far the most efficient, widely used, secure, reliable, easily upgradeable and self-healing. Self-healing is deeply associated with the field of autonomic computing [1]. Autonomic computing are expanding opportunities for the software and operation of computer systems. The basic principle of autonomic computing, to give an opportunity to get an idea of computing systems, which themselves are managed and self-healing in accordance with the main objectives of the level.

II. ANALYSIS OF THE CURRENT STATE

The development of computer and software systems and applications that can control themselves in accordance with high-level guidance from people is called autonomic computing systems (ACS). ACS extends the adaptive behavior of the human nervous system to computing systems and software. Autonomic systems respond to changes in their environment in accordance with the goals set by the system administrator. Autonomic computing model (ACM) seeks to qualify the workload of collecting and administration computing systems with increased automation and objective nomination [2]. The importance of quick automatic error correction and self-healing of computing systems is related to the reason that can cause the shutdown of various applications for business or IT infrastructure of the enterprise for several hours. For example, affect the operation of a web application and cause it to stop. These factors can be both internal and external. Internal factors include viruses, various malicious programs that can affect the operation of the server. External factors include attackers who attack a website and modify the content of web pages or web applications for a variety of reasons, including the use of various methods such as xss, sql-injection. After installing a web application on a host server, many issues arise including removing, replacing or modifying a component. The risk of having one of these three factors is very high. For example, replacing a web application verification component with an intruder would result in the disclosure of confidential information about clients. Thus, in the implementation of the mechanisms of autonomy and self-healing of the system, human functions are limited by the level of Supervision [3]. In this case, the subsystems that generally implement the concept of autonomic calculations, must have at the input of the analysis system a full vector of values of indicators that fully reflect the basic processes of the systems. The dimensionality of this vector is determined by the complexity of the systems, so at present it is necessary to develop a comprehensive criterion for calculating the evaluation of indicators, in order to minimize control effects under harsh conditions to ensure sustainable operation [4]. Thanks to the technology of autonomic computing, today it is possible to implement the functions of self-recovery of IT systems, which may be required in hardware and software failures, for self-protection in a computer network, for self-management of IT resources, to optimize the system as a whole.

III. CONCLUSIONS

The main goal of self-healing is to create an automated system capable of self-healing without human intervention. Such a system has various predefined actions and procedures that are suitable for recovering the system from various expected failure states, which can cause the system to go from an idle state to a healthy one. Self-healing property - control of a set of environmental factors faced by the system [5]. Thus, in the course of studying self-healing systems, it can be concluded that there are various features that characterize self-healing mechanisms that create opportunities for building a model and developing a method for self-healing of the process of functioning of information and computing systems in real time.

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