

## PERFORMANCE ASSESSMENT OF IAAS INFRASTRUCTURE COMPONENTS

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The abstracts are devoted to an analysis of the factors that influence the performance of cloud infrastructure components in which services are provided according to the IaaS model, and evaluation of the performance of such systems.

The paradigm for building cloud infrastructures nowadays is primarily related to the use of nested virtualization methodology [1-2]. This methodology is based on a number of principles, models, methods, and the technologies that implement them [3-4]. Most of them are devoted to solving the general problem of increasing the reliability of the above class of infrastructures by creating redundancy systems. At the same time, the task of evaluating the performance of cloud infrastructure components when selecting a service usage scheme is relevant.

In this paper, Infrastructure as a Service (IaaS) model is considered as a cloud infrastructure. IaaS is a service model within which the consumer is allowed to manage data processing and storage facilities, communication networks and other fundamental computing resources on which the consumer can host and install any software, which may include operating systems and applications. The consumer does not control the physical and virtual infrastructure that underpins the cloud, but it does control the operating systems, storage systems, installed software and has limited control over certain network components and host firewalls. The task of assessing performance is complicated by the fact that the end user cannot always obtain information about the physical infrastructure of the server, cluster, data center.

When leasing virtual infrastructure from an IaaS provider, there are different scales of IaaS services: virtual server (VPS/VDS) and virtual network. In the first case, a customer rents a single virtual server; in the second, it rents a pool of virtual servers with the option of consolidating them into a virtual container.

As a mathematical model to estimate performance of the IaaS infrastructure components we propose to use:

$$S(I) = \lim_{t \rightarrow \infty} \frac{\log B(t)}{t},$$

where  $S(I)$  is the computational capacity of the component, defined by the execution of I-tasks;  $B(t)$  - the number of different tasks whose execution time is equal to  $t$ .

As a result of experiments, using tools [4], a comparative analysis was carried out to obtain an estimate of the performance of IaaS infrastructures of Google Cloud vendors and their own. The task chosen was a search for prime numbers using the Sundaram lattice method. The detailed conditions of the experiment are described in the report.

The results showed that Google Cloud uses an approach that does not allow monopolization of computing resources, i.e. its virtualization concept is nested, its own infrastructure natively demonstrated the lack of nested virtualization system, as monopolization of resources took place. Thus, the paper proposes further research using the proposed approach to evaluate the performance of cloud infrastructure components.

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