MODULAR DATA CENTER FOR SCIENTIFIC DATA PROCESSING

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ABSTRACT. In mid-2000 there were the first mobile (containerized) data centers. The need to rapidly deliver IT infrastructure was partly satisfied by similar solutions. Stage by stage growth was implemented into a classical data centers even earlier. Modular data center brought together the benefits of mobility and maximum flexibility in the stage by stage of capacity growth. In this paper, shows the specificity of modular processing centers of scientific data and provides relevant examples of such data centers.

Key words: mobile data center.

Data centers are separate buildings with special equipment in the form of servers, networking devices and elements of uninterrupted and an independent power supply. The functional purpose of the data center is already clear from the title; they provide storage, transmission and processing of data for one or more elements and allow users to ensure the safety and integrity of data insertion. Data centers are very popular not only in the scientific community, and their services are in the same organization with extensive customer bases, as well as organizations that need to file storage with a high degree of security, in this case provides allocated space, maintenance of communication link, power supply, cooling and safety systems and the user creates a personal data center within that space. Despite a lot of positive aspects, the data center has one big disadvantage, which is short-lived. The development of information technology has a very high and ever-increasing speed, which leads to the rapid obsolescence of technical equipment data center. For example, a personal computer, purchased at a fixed price in a year significantly loses competitiveness in comparison with more modern, similar models. And if for a single PC, this loss seems insignificant, the scale data center performance decrease obviously. According to the most optimistic calculations fully formed center is able to be relevant on the market just for 3 years; this will not include the time it takes for building, equipping and setting up the equipment. Therefore, in the middle of the 2000s put into production, the so-called modular or mobile data center (MDC).

The main difference between the modular data center to data center is easiness and fast speed of installation and configuration of the necessary equipment. Average values for modular data centers show that the cost of the initial installation is reduced by 13%, and deployment time by 60%. All of this is due to the fact that the MDC is the main frame that is not monolithic building that requires a great effort on the construction and design consisting of sandwich panels. To organize such a structure you do not need a lot of space, and the internal equipment is completely determined by the customer and can be scaled according to high requirements (with the same ease can be made and the reduction of production capacity). Modular data centers can be easily disassembled and transported, if necessary, to a new place and just as quickly starts to work.

Despite the fact that the various firms assemble their data centers in different configurations, the basic structural components remain unchanged. Container internal construction worker protection from the external environment is created from a wide range of materials and allows, within certain limits to vary the size of the container desired. The container can be installed on almost any surface topography due to adjustable racks. Such a solution cannot build a special area for placing mobile data center to install enough hard surfaces - asphalt or concrete. Placed inside the container stands for the installation of IT equipment. The number, height and overall size of racks completely by dimensions of the container. The power supply system includes all the wiring electricity network in the container - the main switchboard, power sources, uninterruptible power supply (UPS) and battery. If necessary, you can install an additional diesel generator to power the equipment in the event of failure of the primary network and the lack of power of the main unit. The complex also comprises a fuel system providing fuel generators, and a system to exhaust. The air conditioning system includes indoor and outdoor units of air conditioners with air heating systems, autonomous heating the condensate drain from air conditioners, excluding the possibility of freezing, and the protection of outdoor units from vandalism and accidental damage. Remote monitoring system enables real-time control of more than 100 environmental parameters and the state of MDC, such as temperature, humidity, state power and the status of the access control system. The cable system consisting of copper and fiber optic communications provides the versatility and flexibility when connecting and reconnecting equipment racks. All cables are routed in accessible troughs, making it easy to

diagnose and repair as necessary. It is also an integral part of the data center is the automatic fire extinguishing system, which provides safe extinguishing fires in case of emergency situations.

Step by step the mobile data centers are becoming increasingly popular. In 2011, their number in Russia was about 10. Over the years, the demand from the oil and gas industry, metallurgical and energy industries, industrial enterprises. Among the factors of growth in demand for mobile data center analyst firm J'son & Partners (J & P) refers to an increase in Internet traffic, the importance of continuous operation of Internet applications and integration with the global economy. Despite the small demand for the MDC in 2011, some of integrators in Russia continued to work on technological solutions in this area. It is companies such as Stack Group, offering a mobile solution Stack.Kub, "IT", "Radius VIP" and "Sitronics IT" and "Technoserv A/C". A number of projects in this direction was at such companies as "Cherus" and "Envision Group".

For example, a feature of the project was the ability to create Stack.Kub MDC both indoors and in the open space. Time of this data center indefinitely- some resources can be replaced on the fly, without stopping in the provision of services. Minimum set to create a data center includes a module size of 24 × 6 × 7 cubic meters, which includes the server room, air locks and air cooling systems.

In the first quarter of 2013 a modular data center is the new generation was launched in Pushchino (Moscow region) to 150 racks with a load of 10 kW per rack. Capacities are commissioned as needed, allowing you to receive a return on investment almost immediately, and the modernization of the infrastructure for the new tasks carried out by a given deadline and without interruption in access to services already provided. The total power consumption of 2.5 MW, of which the equipment customers – 1.5 MW. Fault protection is provided in the power supply modular UPS with a total capacity of 1.5 MW, as well as backup power supply capacity of 3,000 kVA. Due to the specific technology Stack.KUB every 25 racks with 100 MDC comparable average data center racks or stationary container type.

In conclusion, I would say that the modular data centers occupy a special position among data centers, similar to that previously held the position of laptops desktops. Time has shown that often the mobility and ease of installation is more important than power.

Furthermore, the development of modern technology has led to the fact that a large number of current notebooks in its production capacity reached almost the same capabilities of modern personal computers, which means that over time, modular data centers will be comparable in strength to the stationary, while all the way is having its advantages in the form of constant mobility, easy upgrades and speed of installation.