

**Development of an automated parameter control system
rooms and workshops based on cloud technologies.**

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Аннотация: В статье рассмотрены различными параметрами комнат и цехов с помощью облачных технологий. Вначале выдана общая информация про облачных технологий его виды и свойства а также проанализировано типовое и различные построения систем управления параметрами комнат и цехов, а далее рассматривается внедрение данных облачных технологий в подобные системы.

Ключевые слова: параметр, комната, цех, интеллектуальное производственное здание, Интернет вещей, облачные технологии и вычисления.

Annotation: Makolada bulutli technologylar erdamida hona va tsehlarning turli khil parameterlarini masofadan turib boshkarish usullarini tashkil qilish imkoniyatlari kʻyrib chikilgan. Boshida bulutli technologylarning turlari va hossalari tugrisida umumiy maʼlumot berylgan boʻlib, shuningdek hona va tsehlarning parametrlarini odatiy hamda turli khil boshkarish tisiplarini kurysh usullari tahlil qilingan, keyinchalik esa ushbu bulutli technologylarni shu tisiplarda qʻyullanilishi kʻyrib chikilgan.

Kalit suzlar: parameter, hona, workshop, intellectual ishlab chikarish binosi, internet buyumlar, bulutli technologylar va hisoblashlar.

Annotation: The article discusses the ways of organizing remote control of various parameters of rooms and workshops with the use of cloud technologies. First, general information about cloud technologies was issued and properties were analyzed (control of parameters of rooms and workshops, and then the introduction of cloud data from similar systems is considered.

Key words: The process building of parameter, room and workshop, intellectual, internet things, cloud-based technologies of thawing.

Cloud computing (from English cloud computing) is a complex of cloud technologies that provides a user connected to a given network with widespread and convenient network access to his computing resources (data storage devices, data networks, applications, etc.). Based on this, the user at any time and from anywhere on earth, wherever he is, must be able to take control of the hardware and software part of the platform, the characteristics and properties of which can be changed at his discretion “on the fly.” The word hardware-software platform is understood as a single integrated complex of information and communication means of computer technology and various system programs.

According to the user, cloud technologies and its computing enable the user to receive computing resources over the global network from an external provider in the form of these

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services, payment for which can be made depending on the volume of resources used. At the same time, the amount of computing resources used in the cloud is a virtual computer, to which the user gets access at his disposal, very quickly adapts to current user requests and data. This ease of access to data and services is ensured by support for a very wide range of terminal devices such as personal computers, laptops, mobile phones, Internet tablets.

The US-based National Institute of Standards and Technology (NIST) identifies the following mandatory properties for cloud technologies and cloud computing:

- self-service on demand – the user independently has the right to choose what types of computing technologies and resources he will use, and can, if necessary, very quickly change this type without coordination with the provider of these services;

- universal type of network access – these services must be available via a global data network at any time, regardless of what type of communication device is used by the user;

- general pooling of resources (resource pooling) - the provider of these services has the right to combine the computing technologies at its disposal into a single pool (from the English “pool” - means a common boiler) for the rapid redistribution of this data between users; but at the same time, users control only the basic properties and parameters of these services (for example, the volume of data transfer, access speed and networks), and the main distribution of the provided data resources is performed by the supplier;

- very fast and instantaneous ability to change data (flexibility and elasticity) - the computing capabilities and power provided and provided to the user can instantly increase or decrease automatically, depending on the user’s needs;

- accounting for use and consumption - the service provider automatically calculates the resources used (the amount of data stored, the amount of received and transmitted data, the number of users and transactions, etc.), and on this basis estimates the volume of services provided to consumers.

All administrative or industrial buildings consist of various types of subsystems responsible for performing certain functions that solve different problems during the operation of this building. As these subsystems became more complex and the amount of work they performed increased, managing these subsystems became more and more difficult.

A modern industrial building of this type is a city in miniature. It offers virtually all the services that were previously indispensable attributes of the city economy. Such industrial buildings usually have an administrative department or administrators who work and maintain this system around the clock. But instead of this, service personnel can use various automatic means, which themselves manage the tasks assigned to them, such as heating, ventilation, maintaining a microclimate, temperature, lighting, fire alarm, smoke extermination, entry/exit control, etc.

The term “intelligent industrial building” is used to refer to modern industrial buildings in which engineering, information communication and security systems are combined into an entire complex intelligent system. Such an intelligent system provides greater safety and comfort for work. The main reason for installing smart systems in industrial buildings is to improve work comfort by automating basic tasks.

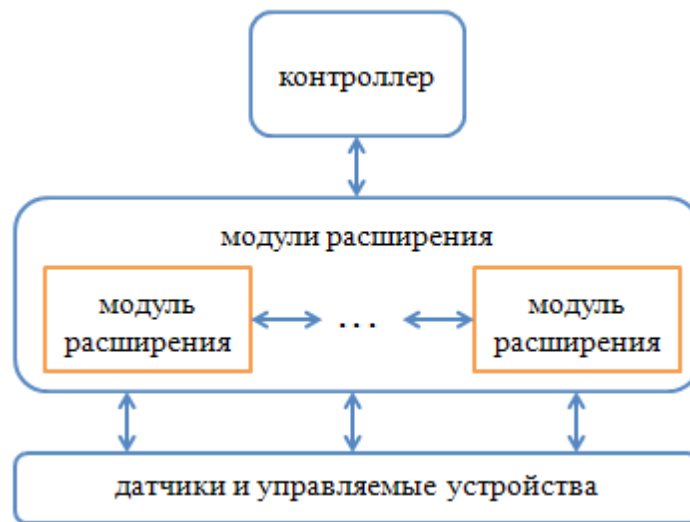
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Smart manufacturing building technologies consist of two main components: hardware and software. The hardware consists of the following components:

- a controller (this role can be played by a regular personal computer, phone, tablet or laptop), in which software is installed to control the systems of an intelligent industrial building;
- expansion devices are special devices to which various sensors and controlled devices are connected;
- end devices are different sensors for monitoring various parameters and devices the control of which falls on the shoulders of an intelligent production building.

Figure-1 shows a typical hardware diagram of an intelligent manufacturing building.



Picture 1

In this case, configuration, management and diagnostics of intelligent industrial building systems are performed from a desktop computer or laptop.

In 1999, the founder of the Auto-ID Center research center, Kevin Ashton, proposed a new term in cloud-based intelligent technologies and computing and called it “Internet of Things”. The idea is that in the future, the tasks and work performed by the new generation will not only be “intelligent and smart”, but also united into a single global network - which will be called the “Internet of Things”. This idea assumes that communication devices such as smartphones, tablets, computers, laptops, TVs, various sensors, as well as controlled devices with Wi-Fi or Bluetooth wireless connections will be able to interact and exchange various information among themselves and users through these wireless connections.

Today, the use of mobile devices and various tablets that allow access to the Internet among modern humanity has become very popular and widespread, and this principle is very suitable for the concept and idea of using cloud technologies in the Internet of Things, which allows the user to remotely control different parameters of rooms and workshops from different distances intelligent production building.

The main features and benefits of using remote access control of various systems using cloud technologies of an intelligent industrial building include the following parameters:

Security - when workers are outside their workplace, rooms or workshops, it is possible, using cloud technologies, to remotely monitor the situation in rooms and workshops using cameras, or remote monitoring in workshops and rooms by tracking the indicators of

various sensors used in security systems (fire sensors , sensors for temperature, sensors for opening / closing doors, etc.). In addition, for those workers who very often forget to turn off the lights or some devices designed to control various parameters of rooms and workshops, this function will be very useful.

Comfort is the opportunity for workers and users to work at their workplace with intelligent computing systems at hand that are closely connected with cloud technologies, allowing them to manage an intelligent production building with very convenient interfaces designed for users. Basically, the control systems of an intelligent industrial building using cloud technologies use previously prepared scripts by the software developer to control various parameters of rooms and workshops, when all work is carried out by this system automatically based on the positions and situations in the rooms and workshops. Sometimes some users of such intelligent systems with the help of cloud technologies can do without such ready-made scripts, and this gives them the opportunity, having remote control functions from various distances, to independently select and command the work performed by the intelligent system, for example, they can do it themselves when approaching their workshop, room or when when leaving the workplace, turn on or off various parameters (turn on or off lighting, various control devices, heating, ventilation, etc. in advance).

The ability to access and perform remote access functions from various distances in an intelligent production building is possible through the use of cloud technologies and computing, when all users of this system are provided with the ability to share and universally access global network computing resources, services and various applications.

In management Intelligent production buildings using cloud technologies and computing can be used in two ways. In the first option, the main controller or server for managing various sensors and parameters of devices of an intelligent production building can be remotely accessed by the cloud and does not have to be located in the room or workshop itself; thanks to this property, control of various parameters of rooms and workshops of an intelligent production building can be carried out from any location of the user with access to the global Internet. In the second option (Fig. 2), the main controller or server for managing various sensors and parameters of devices in an intelligent production building can be located in the room itself or in the workshop, but only remote control will be performed through cloud technologies and computing with access to the global Internet — and all other software of these systems will be installed on the cloud server. In addition, in the second case, a function is required from a production controller that provides technical parameters located in a workshop or room only to provide various sensors and modules with expanded access to the global Internet, and this in turn reduces the requirements and tasks inserted into the technical characteristics of the controller or server . It is possible to introduce remote control using cloud technologies using the global Internet into an existing system of an intelligent production building; this does not require replacing any technical equipment and devices, it is only sufficient to provide access to the cloud server for control servers.



Rice. 2. Scheme of technical support for an intelligent industrial building
with remote control function via the Internet

The ability to access management to various systems of an intelligent industrial building can be achieved through web browser programs designed to display WEB sites installed on personal computers and laptops, or through special mobile applications designed for mobile devices.

Conclusion

The article examined the use of cloud technologies in intelligent industrial building systems. The use of such technologies allows users to significantly increase safety and comfort at work, as well as simplify management and further maintenance, and expand the installed systems of an intelligent industrial building.

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