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Based on WebGIS IOTResearch information release system

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ABSTRACT

The internet of things is developed based on the internet, and the Web GIS is a kind of geographic information system running on the internet. Both have their own characteristics but are inextricably linked. This paper depicts the internet of things and the Web GIS, and discuss the correlation between the two concepts.

KEYWORDS

The internet of things; Web GIS; GIS.



INTRODUCTION

The Internet of Things (IOT, Internet of Things) is connected to the Internet "content", was originally by beauty The MIT self-knowledge center first proposed in 1999, it was not until 2005 by the international telecommunication Alliance ITU formally put forward. IOT more formal definition is through radio frequency identification (RFID), ir Sensors, global positioning system (GPS), such as the laser scanner information sensing device, according to the contract agreement, to any Items with an Internet connection, exchange of information and communication, in order to realize intelligent identification, location, with Tracing, monitoring and management of a network^[1].

In January 2009, IBM's chief executive Sam parmesan puts forward "smarter planet" (Smart Earth) idea, it is suggested that the new government investment is a new generation of wisdom Type of infrastructure, Obama gave a positive response to this, and on Rose to national strategy in the United States, cause sensation throughout the world. "Smarter planet" core idea is to apply to all kinds of sensors to people The life of various objects, and the ability to connect each other, to form "Internet of things", by supercomputers and cloud computing will "Internet of things" integration to realize online digital earth and the human society and the integration of the physical system^[2]. On the basis of that, people can in a more detailed and dynamic way Manage the production and life, so as to achieve "wisdom" state. Wisdom in the earth, People can realize the wisdom, wisdom, intelligence community, city Hui family, wisdom, mining, etc.

WebGIS IOT information release system

IOT is established on the basis of the Internet, and the Internet of things was greatly extend and expand, extended and expanded into any items between is its clients, exchange of information and communication^[3].

The technical architecture and key technologies of Internet of things^[3]. According to the operation of the Internet of things, can the Internet of things on the level of the technical architecture is divided into three levels: perception layer, network layer and application layer.

Perception layer is made up of all kinds of sensor and sensor gateway, such as temperature sensor, appropriate sensor, pressure sensor, 2 d label code, RFID tags and cameras sense terminals. Perception layer's role is to identify objects, collecting information, similar to human peripheral nervous system.

The network layer is composed of all kinds of wired and wireless network system, including computer terminals, all kinds of network equipment and other hardware facilities and network management system, all kinds of network communication protocol^[4], such as cloud computing platform software system. The role of the network layer is passed and data processing layer perception.

The application layer is the Internet of things, and the user (including person, organization, and other systems) interface, it combines with industry demand, to realize the intelligent application of Internet of things. In particular, the application layer information and the storage of implementation, the application of data mining, decision making, etc., involving the mass information intelligent processing, distributed computing, middleware^[4], information discovery and other technology.

IOT realizes the "things", from the perception of information perception to the network layer of information transmission and processing, to the industry application of the application layer, each layer involves multiple technologies, can say that the Internet of things is the comprehensive application of high and new technology. A nutshell, the key technology of Internet of things is mainly to identify, sensing, communication technology and middleware technology.

Sensor network is a certain amount of sensor nodes (may very much), they are in the way of a wireless multiple hops network communication. Sensor network design goal is energy efficiency (which is the most scarce resources in sensor networks), scalability (the number of nodes may be very high), reliability (the network may be used to report an emergency) and robustness (sensor nodes may be failure) for a variety of reasons. Today, most commercial wireless sensor network solutions are IEEE-802.15.4 standard, it is defined as the physical layer and Mac layer in wireless personal area network of low power consumption and low bit rate communication^[4].

Middleware is set between the technology layer and network layer software layer or a series of sub-layer. It hides the technical details of different layers, make the jobs of programmers simplification, complex functions by using simple interface. In recent years tend to follow the service-oriented approach of middleware architecture (SOA). SOA is a component model, it will be the application of different functional units (become) through well-defined interfaces and contracts between these services. Interface is defined using neutral manner; it should be independent of implementation services hardware platform, operating system and programming language^[5]. This makes the building in a variety of services in such a system can be a unified and general way to interact. Median architecture mainly consists of several levels:

1)The application. Application is the at the top of the architecture, all function of the system output to the end user. This layer is not considered part of the middleware but developed all middleware functions. By using a standard web service protocols and service composition technology, the application can be achieved for the perfect integration between distributed systems and applications.

2)Service composition technology. This is at the top of the middle price architecture based on SOA of a normal layer. It provides the network object provided by the combination of a single service function, to establish a specific application^[3]. The concept of no devices in this layer, the only visible is service. This layer has a connection with service entity is the focus of the knowledge base, it performed at run time to establish a composite service.

3)Service management. The main function of this layer provided is expected to be used for each object, and attend to them in the Internet of things of management. The basic set of services including: object dynamic search, condition monitoring and service configuration. This layer can be enabled at run time remote deployment of new services, to meet the needs of the application.

4)Abstract objects. Internet of things since a large number of heterogeneous object set, need an abstraction layer in order to a common language and the unity on a visit to different devices. Mainly consists of two levels: interface and communication layer. The former provides a network interface, through a standard web services several methods available, and is responsible for the management of all involved to communicate with the outside world in and out of the news operation; Which implement the logic behind the web service method, and converts these methods to a particular instruction set equipment to achieve the communication with the real world objects.

5)Trust, privacy and security management. The mechanism of the Internet of things will bring us the threat of an inevitable, embedded RFID tags on your belongings may reveal our information.

WebGIS technology

Geographic Information SystemGeo-Information system (GIS),Sometimes referred to as the "geological information system" or "resource and environment information system"^[5]. It is defined as a certain very important space information system, with computer hardware and software system support, for the whole or part of the earth surface (including the atmosphere) space about the geographic distribution of data acquisition, storage, management, operation, analysis, display and description of technical system.

The continuous development of the Internet of things perfect gradually together as a whole, the whole world in this environment, geographic information system technology to the development of WebGIS will be also will be an important direction. WebGIS using Web technology to transplant, extension and improvement of geographic information system technology, it is based on the network of C - S structure (client-server) system, using the Internet for the exchange of information between the client and the server, so it is a distributed system, the user and the server can be distributed in different locations and different computer platforms. WebGIS in addition to the traditional GIS spatial data management and analysis function, also can be established for spatial data, spatial model services, web resources organization and so on. WebGIS has the following features^[6]:

1)Globalization of browser/server applications, any global Internet users can access the WWW node WebGIS server provides all kinds of GIS service, even to global GIS data update.

2)Really popular GIS, due to the explosive development of Internet technology, WebGIS for more users with the use of GIS.

3) Good extensibility, WebGIS is easy for seamless integration with the other information in the Web service, can build a flexible GIS application.

4)Cross-platform features; the traditional GIS software on different operating systems need to develop different versions, and can't do cross-platform. And the WebGIS based on Java can truly cross-platform.

The internet of things and WebGIS

IOT (Internet of Things, IOT), the items of information through radio frequency identification (RFID), laser scanners, such as information sensing devices connected to the Internet, through the network to reach the specified information processing center, finally realizes the content and content^[4], the automation of information interaction between people and Things, and processing of the intelligent network^[7]. The Internet of things is considered to be the computer, Internet and mobile communication network of after another wave of information industry. The international telecommunications union (ITU) issued (ITU Internet report 2005: the Internet of things ", according to the report, the ubiquitous Internet communication era is coming, all the objects in the world from tires to toothbrushes, from houses to tissues can be actively exchanged over the Internet. Radio frequency identification (RFID) technology, sensor technology, nano technology, intelligent embedded technology will be applied more widely.

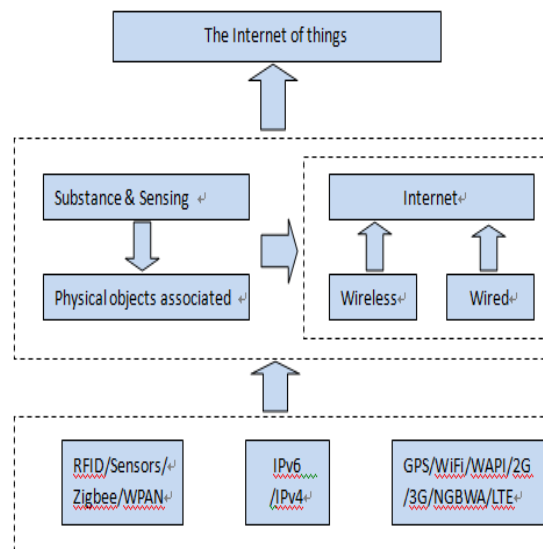


Figure 1 : System logic diagram

During the construction of Internet of things, can make use of geographic information platform of the sensor layout of spatial analysis ability Site selection, so as to achieve science and rationality of the terminal layout, After the completion of the Internet of things, can by geography Coupon platform all the objects associated objects into a unified space platform, which can be intuitive, vivid, fast Speed to al object to locate, track, to find and control^[7], shown in Figure 1.

First, the data source Angle: the Internet of things depend on perception layer of various sensors and RFID tags to collect information about themselves, such as items its own name, specification, origin, date of production and the surrounding environment such as temperature, humidity, location etc. The Internet of things at the same time perception layer collected data types varied, both in general and data, including image, audio, video and other multimedia data. And WebGIS is network forms of geographic information system, which incorporates data is the same as the traditional GIS system supported by data, mainly divided into raster data and vector data, and can also read the GPS data. Although WebGIS system applications of existing data some also include a variety of media, but these data do not participate in the management analysis of GIS system. In addition, the original data collection is one of the important tasks of Internet of things, is the foundation of the Internet of things, and the emphasis of WebGIS lies in the management of data analysis, and other functions, the original data is usually through various means such as remote sensing image, digital mapping, the GPS measurements, directly to the WebGIS system processing^[2,3].

Secondly, data transmission, the physical network using the network layer, including sensor network, a variety of cable and wireless network will be distributed in various network nodes connected into a whole, mutual exchange of information. The quality of the performance of each node and the network environment affects the data transmission speed and quality at the same time. For WebGIS, also need a variety of cable and wireless network, but only the traditional network, is not involved in sensor networks. WebGIS users use the browser to enjoy the service, so as long as the network quality is good, the WebGIS system can work normally^[8].

WebGIS information release system

The overall architecture consists of three layers of perception layer, transport layer, application layer respectively.

Aware of layer: layer includes data acquisition layer and the sensor network networking and collaborative information processing layer. Data collection layer includes RFID, monitoring sensor, mobile phones, controller and sensors, sensor network gateway equipment. Sensor network networking and collaborative information processing layer includes: in the low speed and high speed transmission from close range, self-organization, collaborative information processing technology, the sensor middleware technology. This layer of the core technology is the wireless sensor network (WSN) and NFC technology. The layer in the application of intelligent mine mainly for information monitoring and collection. In the intelligent mine, through radio frequency identification tag to static attributes of the object identification, can accurate positioning objects^[8]; All kinds of field sensors can be real-time monitoring of the environment and working conditions on site equipment and information transmission, etc.

The transport layer including a variety of communication networks and the Internet form converged network. Various monitoring data through local area network, wireless sensor network to form the coverage area of the information collected, and then by the transport layer to transmit data processing platform.

Application layer combining Internet technology and coal industries, realize intelligent widespread application solutions, use of the existing mobile phone^[9], personal computer (PersonalComputer, PC), PDA (PersonalDigitalAssistant), and other terminal application. According to the concept of Internet of things and structure level, the layer is the key step in the Internet of things technology have professional application, the main task of layer is intelligent computation and analysis, service of coal mine safety production scheduling, and then to the perception layer and other terminal equipment information. Application layer includes data resource layer, application platform, application system layer, shown as Figure 2.

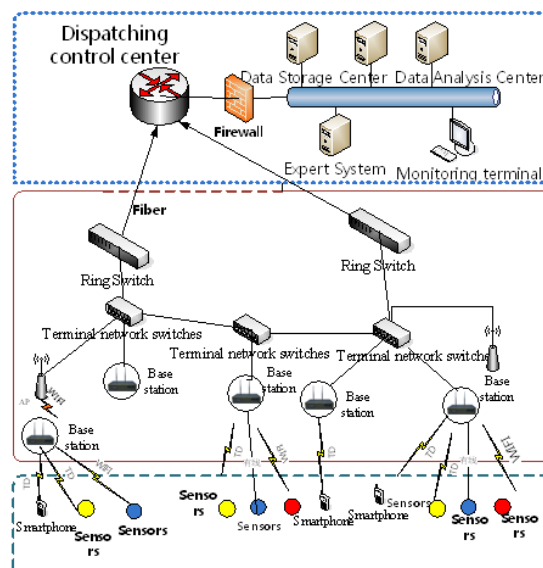


Figure 2 : Structural frame system

- 1) Information acquisition system, including the environment and working conditions on site equipment construction of travel information access, video information access.
- 2) Transmission network system: including communications transmission system, computer network system, network security and the construction of management system.
- 3) IOT application management system: including coal mine environmental and working conditions on site equipment running condition monitoring and early warning system, the construction of safety production scheduling management system.
- 4) Application support platform, including software support platform and the construction of the hardware support platform.
- 5) IOT center: including safety dispatching center, information center, the production operation monitoring center construction.
- 6) Security system: including the system construction, technical standards, technical support, and safety measures.

CONCLUSIONS

- 1) To combine the GIS technology and Internet technology, makes the system both GIS concise intuitive presentation, but also has the Internet of things ability of huge amounts of data and information fusion.
- 2) Rest-based Web services development, abandoned the traditional desktop GIS development system, has a lower cost of development, the user is more popular characteristic, and can also be platform independent. Not only that, compared with the previous soap-based Web services, REST style more flexible and convenient better cache support and system scalability is stronger, even without programming can use REST services, it reduces the technical threshold, increase the ease of use and flexibility of the system.

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