Self-network Server Based on Ultra - miniature Web Technology

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Abstract. The self-network server follows the concept of "Internet +" and conducts an in-depth integration of the Internet's innovative achievements and the socioeconomic status. By employment of the ultra-miniature web server technology and network environment migration technology, it provides a solution to the problem of the wireless advertising router's inability to function in the absence of external network. Besides being applied to high-speed railway, cafes, subway, aircrafts and other places, the self-network server will also try to access users with needs of resource sharing. Efforts will also be made to improve the added value of self-network server by collaborating with enterprises to build brands and form a complete industrial chain.

Introduction

By chance, I and my team managed to design and develop a self-network server based on some degree of technical support. It can provide web server functions, local resources, network authentication, advertising, and the function of automatic pop-up promotional page of wireless network access in the absence of internet connectivity.

The self-network server follows the concept of "Internet +" and conducts an in-depth integration of the Internet's innovative achievements and the socioeconomic status. It helps to promote technological progress, efficiency and organizational change. It enhances innovation and productivity of the real economy, and also forms a new and more extensive pattern of socioeconomic development in which the Internet serves as infrastructure and innovative factors. The self-network server will bring great changes to the public service model, and give full play to Internet's optimization and integration functions in the allocation of production factors under the impetus of innovation 2.0, which is certainly to make people's lives more convenient.

With the improvement of economic conditions, people have more opportunities to travel and become more inclined to the direction of mobile terminals. However, no mode of transport is able to resolve the problems of high cost of Internet access and unstable connectivity. The realization of an internal multimedia environment without resort to external network may be a better choice. At the same time, we find that wireless ad push in public places is more and more popular with advertisers and physical stores, but its application, promotion and user experience effect are barely satisfactory due to defects in network protocol design and lack of flexibility and timeliness resulted from the use of remote servers.

Advantages of the Self-network

Instead of the traditional network, people who travel frequently need a more stable, cheaper and more convenient way of networking. In view of the aspects above, the network server can effectively solve such problem as large-amount power consumption, huge space occupancy, and complicated maintenance procedures which emerge when web server is used on small- and medium- sized occasions to provide multimedia services. Ultra-miniature web server is a specifically developed micro-embedded server which takes domestic initiative.   The architecture design is divided into in two parts: underlying hardware design and server software architecture design. The underlying structure should provide the upper application with secure, stable, and energy-saving hardware-level support, while the server software architecture should provide stable and efficient data load processing for concurrent data traffic at all levels and a low-coupling and

efficiently distributed server processing model, based on the underlying hardware and embedded operating system. In this case, the power consumption of 1.5W completely replaces web application where the rate of concurrency is not high. In addition to providing concurrent web traffic less than 200, supporting static and dynamic web pages, and providing audio and video data streams, the self-network server also has the features of hardware stability and reliability, load balance, dynamic expansion, and high efficiency and low power consumption. Designed according to the preceding features, the network server is finely produced, small and exquisite, lightweight and practical, and thus suitable for being carried with traveling people.

The self-network server makes use of ultra-miniature web server technology to address existing problems on the market, including the necessity of remote authentication server when performing wireless ads push under the wifidog protocol, slow authentication, slow picture loading, and authentication failure. This machine employs the built-in web environment to provide web server functions, which leads to abandonment of the remote host and authentication or push advertising localization. Zero communication distance will also be realized because the communication process does not require a remote host. It can also act as an advertising platform for profit to provide stable financial support for the products.

By employment of the ultra-miniature web server technology and network environment migration technology, the self-network server provides a solution to the problem of the wireless advertising router's inability to function in the absence of external network. The traditional advertising router authentication mode is to determine whether the external network is unobstructed. The request host first sends a target domain name to the DNS server, which analyzes the domain name and then sends a corresponding IP address back to the request host. Next, the request host accesses the IP address, in which process the wifidog programs capture request host mac address and target address packet to compare with their own internal authentication mac white list. If the addresses are included in the white list, the request host is allowed to continue IP access. Otherwise, the request host is redirected to the remote authentication server which provides authentication and page transmission functions. Unlike the traditional type, this machine is able to internally perform the functions of external network access and authentication in the absence of network access and remote server support, which leads to a shorter and more efficient process. Physical products are as showed in the figures below:

Figure 1.   Different parts of the physical product

Prospects of Application

Our team intends to apply it to high-speed railway, cafes, subway, aircrafts and other places, and to introduce it to users with needs of resource sharing. Efforts will also be made to improve the added value of self-network server by collaborating with enterprises to build brands and form a complete industrial chain. The Internet is a new tool for public entrepreneurship and innovation. The self-network server taking advantage of the integration of Internet and economic development enjoys broad prospects and unlimited potential, and it is going to contribute a lot to the realization of an economic development model in which the Internet serves as infrastructure and implementation tools. From the perspective of architecture, the design is divided into in two parts: underlying hardware design and server software architecture design. The underlying structure should provide the upper application with secure, stable, and energy-saving hardware-level support, while the server software architecture should provide stable and efficient data load processing for concurrent data traffic at all levels and a low-coupling and efficiently distributed server processing model, based on the underlying hardware and embedded operating system. In this case, the power consumption of 1.5W completely replaces web application where the rate of concurrency is not high.

From the perspective of web server, remote authentication server is necessary when performing wireless ads push under the wifidog protocol on the market, and problems like slow authentication, slow picture loading and authentication failure are ready to occur. This device employs the built-in web environment to provide web server functions, which leads to abandonment of the remote host and authentication or push advertising localization. Zero communication distance will also be realized because the communication process does not require a remote host.

Finally, by employment of the network environment migration technology, it provides a solution to the problem of the wireless advertising router's inability to function in the absence of external network. Self-network will work internally and achieve the purpose of abandoning external network.

Conclusion

The self-network server can be used in any environment without network coverage, which overcomes the difficulty of information sharing under those circumstances. In addition, it can be used in ads push, product introduction, news consulting and many other fields. Our products do not charge any fees and consume no traffic. With features of security, stability, exquisiteness, energy efficiency and rapid operation, the self-network server not only saves large traffic costs while providing great convenience for the public, but also makes a new marketing platform for masses of businesses and advertisers. This is a perfect embodiment of our concept of using "Internet +" to serve the community and stimulate product innovation.

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