

Research on IPv6 transformation route of portal website

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Abstract: With the rapid development of information technology, in the process of the development and application of the Internet, want to give full play to the advantages of the network, need to use IP transformation technology. In this paper, the significance of the upgrade of IPv6 is described, followed by the exploration of the portal site IPv6 transformation technology route selection ideas, and again the route of the optional type of analysis, finally elaborated the portal site IPv6 transformation of the specific steps, in order to be able to provide useful reference for relevant staff.

Key words: portal website; IPv6; Technical route; Protocol conversion; Internet

A portal is a system that accesses a pool of information based on the Internet and in turn provides this information to the Internet. IPv6, as the name implies, is the 6th generation protocol, which belongs to the IP protocol of the network project task. The transformation of portal IPv6 is the update iteration of IP system, which greatly improves the stability of computer. Therefore, it is extremely important and necessary to study this aspect.

1. The significance of upgrading IPv6

Based on technology, the number of IPv4 addresses in use today is 4.3 billion, and they were allocated 12 years ago in 2011. IPv6 has its own unique advantages, such as large address space, small routing table, high security, and support for enhanced multicast and automatic configuration, which lay the foundation for it to adapt to the rapid growth of the future Internet.

From the perspective of industry, IPv6 is of great significance to the Internet. It is not only the foundation of its development, but also an important starting point. The deployment of IPv6 is directly related to the construction of network infrastructure, equipment research and development, and industrial process, and at the same time is closely related to the innovation of the Internet of Things and the application of mobile Internet.

Based on the policy perspective, in 2023, the relevant state departments issued the “Implementation Opinions on Promoting the Evolution of IPv6 Technology and Application Innovation and Development”, which pointed out that the application innovation of IPv6, a key technology, has been pushed to a new height, the innovation ability has been significantly enhanced, and the application scope of innovative technologies such as “IPv6+” is gradually expanding. The application level of IPv6+ industry convergence has also been significantly improved, and the key tasks of deployment have been proposed based on five aspects: technology, innovative industry, infrastructure, industry convergence and security.

2. The choice of technical route for IPv6 transformation of portal websites

2.1 Selection Principles

The mode adopted in the transformation stage is comprehensive transformation, and the transformation contents include: the evaluation of service demand, the scope of transformation, and the results of cost-effective evaluation, and the region is divided into 2 levels. These areas have the demand for IP distribution.

Level 1: refers to high growth or multi-user level.

Level 2: Low growth or few users.

The area with limited transformation during the transformation is the level 1 area, and the transformation carried out at this time is a small scope. After the completion of the construction of the level 1 area, the next need to connect various areas, so that they become a unified whole, and then the level 2 area is incorporated into the system, and then lay the foundation for the transformation portal IPv6 transformation.

2.2 Evaluating the cost performance

When using IPv6 technology to transform portal websites, the first thing to do is to evaluate the cost performance, that is, to make a comparative analysis of the overall effect of different scope of transformation, through the analysis, there are obvious differences between the two. For example, the characteristics of small-scale transformation are: the transformation is not complete, the coverage is narrow, the construction cycle is short, the cost is small. The characteristics of large-scale transformation are as follows: the transformation effect is good, the coverage is wide, the construction period is long, and the cost is large. In the transformation, the relevant personnel should conduct a comprehensive analysis of the capital chain, the return on investment, the return cycle and stability. If the investment can be recovered in two to three years, the stability of the return and the rate of return are guaranteed. The capital chain can meet the actual needs of maintenance and upgrading operations, and the large-scale transformation method can be preferentially selected. By adding the service protocol stack to carry out the portal IPv6 transformation.

2.3 Evaluate service requirements

Assessment of service requirements refers to the comprehensive analysis and understanding of the regional IP allocation situation and the change of distribution requirements when IPv6 is transformed into a portal website, and the choice of technical routes according to the information data. The number of network users in the central and eastern regions of China is huge, and the demand for IP distribution is strong. In addition, the number of portal websites and the number of users are large, which fully explains the urgency of the service demand in the region. At this time, a large-scale transformation method can be chosen. If you want to build a smart city, you can also consider this transformation method, because a small transformation may lead to some conditions in the service center and the Internet of things, such as poor access or access difficulties.

3. Type analysis of portal IPv6 transformation technical route

3.1 Protocol Transformation

This technology refers to the addition of IPv4/IPv6 protocol conversion facilities to other locations, such as the entrance to the IPv4 website, at this time, there is no need to transform the IPv4 source station, as long as the DNS server can resolve the IPv6 protocol access requirements of the corresponding facilities, and can convert the corresponding information, so that it is transferred to the IPv6 address. Next, the facility will read the data from the IPv4 source station and transmit it to the user who has the demand for IPv6 through the conversion protocol. Using this technology to upgrade IPv6, there is no need to change the website code and business system of the IPv4 source station, in fact, it only needs two steps to complete the transformation.

This technique is to add IPv4/IPv6 corresponding protocol conversion facilities to the location of the IPv4 website entrance, without transforming the original 1) Deployment of protocol conversion facilities: deploy one to two conversion facilities at the entrance of the website or convert the protocol to other facilities such as firewalls, load balancers, and configure the corresponding domain name for the IPv6 address.

2) IPv6 DNS requests can often be accepted by the DNS server, the process is simple, that is, only need to configure the IPv6 address, with the help of AAAA resolution records, in order to better complete the IPv6 address, domain name mapping. In the specific operation, when DNS requests AAAA resource records, the server should resolve the URL, so that it becomes an IPv6 address. If DNS requests an AAAA resource record, the server should do the same and become an IPv4 address. This technical solution is simple and convenient to implement, and the scope of application is: complex architecture, old website problem solving.

3.2 Dual-stack technology

This technology can ensure that IPv4 and IPv6 protocol stacks can work together in the network source, and can simultaneously send and receive and process IPv4 and IPv6 packets. This technical solution is a kind of upgrading of the whole system, such as software, equipment and other diverse types of system operation, at the same time should pay attention to the cooperation between each other, therefore, should strengthen the research and thinking of collaborative planning. This kind of transformation includes:

1) Transformation of equipment: Internet related equipment support IPv6, so that the protocol stack is fully open, related hardware such as servers, security equipment, etc., can give IPv4/IPv6 dual support.

2) Transformation of the business system: the IPv6 protocol is fully enabled in some related systems such as application, front desk and back office business management systems, and the work of IPv4/IPv6 dual protocol stack is supported.

3) Transform the source code: modify the IP address code and configuration, so that it becomes the domain name address that needs to be used. This technology focuses on the complete transformation, the transformation effect is good, while seeing the advantages, should not ignore its disadvantages, such as the need to upgrade a lot of hardware, investment and so on.

3.3 Selection Angle

From the perspective of implementation principle, the protocol conversion in the TCP/IP protocol standard belongs to the processing scheme combining the transport layer and the network layer, which usually solves the problem of network interworking. The dual-stack technology mainly refers to the application layer processing scheme, which belongs to application interworking. Compared with network interworking, the scheme has a better effect and a more thorough upgrade. The upgrade application objectives are as follows:

1) Double-stack technology: the main advantages are that it can be completely transformed, good interoperability, wider applicability, and no need to participate in the conversion facilities of the middle layer; The main disadvantage is large investment and long cycle. This technology is the ultimate goal.

2) Protocol conversion: The main advantages are smaller scope of website transformation, short deployment time, small investment scale, easy to maintain and operate; The main disadvantage is that the peer-to-peer access function of the IPv6 protocol cannot be realized, which increases the performance bottleneck and the point of failure. This technology belongs to a transitional scheme in the rapid deployment. If the website belongs to a large website with 1 billion daily visits, it often needs high operation and maintenance technical capabilities in order to deal with network attacks or network failures in time. At this time, it should be upgraded to make it become double-stack. For small and medium-sized websites, lack of technical support, but have sufficient funds, at this time can give priority to the overall plan, that is, directly upgrade it to double stack. If you do not have technical storage, and you are ready for it, and you do not have sufficient funds, you can choose a transition plan, that is, protocol conversion. In addition, you can also combine the old and new degree of the website to choose: the new application system, the new network can be combined with the dual-stack scheme to deploy; The system has been established to consider the capital, complexity, simple and sufficient funds can be directly upgraded to double-stack, complex structure, the old is preferred to choose protocol conversion.

3.4 Choose the route of evolution

In the process of the transition from IPv4 to IPv6, the portal website that needs to be transformed can consider the technical level, the actual situation of the website and its own resources, etc., and select the upgrade means that support IPv6. When choosing a portal website, it can fully learn from the successful conversion of IPv6 protocol in recent years, take the technical standards and requirements of IPv6 as the basis for planning, deployment, establishment of platform systems, networks, etc., so as to successfully complete the transformation and upgrading of IPv6:

- 1) IPv6 address access for service acquisition: get in touch with the operator, get an IPv6 address, and then access it to the corresponding network.
- 2) Network facilities for IPv6 level support: some switches do not need IPv6 processing, no need to upgrade, this type of switch mainly refers to the Ethernet level, at the same time, for layer 2 switches, it can be included in the upgrade scope.
- 3) IPv6 protocol can obtain the full support of the server system; If the system does not support, the version can be upgraded at this time.
- 4) Upgrade the corresponding DNS server. Prioritize IPv6 portals because they contain a transition plan, in which the corresponding websites can implement IPv6 protocol access through protocol conversion facilities, thereby reducing the impact on the network, system and other architectures.

4. The concrete steps of the portal transformation of IPv6

4.1 Make the renovation plan

Make clear the specific plan of selection; For the deployment mode, it should be clear whether the local deployment or the cloud service is selected. Verify the network equipment to determine whether it supports IPv6; Clarify the project budget, etc.

4.2 Connect to an IPv6 network

Choose whether to apply for an IPv6 address according to the specific mode. Specifically, you can apply for the address from the Internet Network Information Center or the operator of China; If the cloud service model is adopted, IPv6 does not need to be applied for but is provided by the cloud service provider.

4.3 Deploying the Address Protocol Translation Device

The address protocol translation device is generally deployed on one side of the core switch, and one or more devices are deployed to convert the single-stack content to dual-stack publishing. If the cloud is used as the service model, the conversion equipment is generally provided by the cloud service provider.

4.4 Configure domain name AAAA records

The device is translated in combination with the domain name, therefore, each subdomain requires AAAA record resolution.

4.5 Evaluating IPv6 function Indicators

According to the relevant national standards, the function indicators of IPv6 are evaluated: IPv6 packet reachable status, domain name AAAA record parsing is correct, etc.

In short, with the development of society, people are paying more and more attention to portal websites, and the requirements are also changing. In this regard, relevant personnel are paying more and more attention to IPv6 transformation. In the transformation, it is extremely important to choose the right technical route, so the relevant personnel should evaluate on the basis of following its principles, and make clear its specific steps, so as to promote the transition from IPv4 to IPv6.

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