Imperative to Build Network Security System and Speed Up the Future Network Construction

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***Abstract*—Network security is a comprehensive discipline involving computer science, network technology, communication technology, cryptography, information security technology, applied mathematics, number theory, information theory and other disciplines. Network security is to protect the hardware, software and data in the network system from accidental or malicious damage, change, and disclosure. The system runs continuously and reliably and normally, and network services are not interrupted. Although network security in the future market prospect is very good, but the Internet structural defects are known, because in the past nearly 20 years of rapid development of Internet technology, the pioneers of the IT industry seems to be technology focuses on the network flexibility and ignore the security of the network, so, in the site after the loss of a large number of network attacks, network security technology becomes emergent vacuum in the information technology, for the maintenance of computer network system security maintenance, inspection and repair network vulnerabilities, virus protection, organized by the national high strength against network has serious threat to all countries in the world, In such an environment, the core technology, key infrastructure is the only rely on independent innovation, create a new network system, with the new architecture, a new design, new technology, new resources, new standard and new application to open up a new network space, the building has an independent sovereign and independent control system of network security, it is imperative to accelerate the future network development.**

Keywords-New Architecture; New IP; New Technology; New Resources; New Standard; New Application

I. INTRODUCTION

The idea of "reorganizing the architecture of the web" is not a new idea. It has been around for 15 years. Since 2007, the international standardization organization ISO/IEC has been carrying out the Future Network standardization project of the new architecture Network system, and has set 2020 as the phased target for commercial use. This paper based on the research and development experience of ISO/IEC future network international standard, it shows that network system innovation is the core benefit of the development of China's information and communication technology, and it is imperative!

II. THE STRUCTURAL FLAWS OF THE INTERNET ARE WELL KNOWN AROUND THE WORLD

China is no exception to the threat posed by state-level organized and high-intensity cyber confrontation to all countries in the world. In order to cope with state-level cyber confrontation, it is impossible not to change the situation that core technologies and key cyber infrastructure are in the hands of others. Core technologies cannot be bought and critical infrastructure cannot be sought. The only possibility is to rely on independent innovation, opening up a new network system, with the new architecture, a new design, new technology, new resources, new standard and new application space to open up a new network, the network construction of new frontier has sovereign and independent control of network security system, set up national network defense system, and for the enterprise and society to build a is not subject to sanctions and cyber threat to the survival and development space of peace. This is how countries and nations survive in the age of cyber warfare.

Under the situation that the Internet monopolizes the global information technology facilities, the proposal of the "new architecture network system" is bound to encounter opposition and obstruction from the Internet vested interests. The statement on Huawei NewIP by IETF, an American corporate standards agency, is a reflection of this. As the ancient saying goes, "each man is his own boss", which is a natural stance for the IETF. However, everything must have a reason. You can't object for the sake of objecting, you have to have a valid reason. Judging by the IETF's claims, the argument is flimsy.

The reason why Huawei proposed the "New IP" proposal emphasizes the structural defects of the Internet, and takes the 128-bit fixed-length address of the "next generation Internet" as an example to illustrate that in many application scenarios, shorter address length is needed, and the structure of the Internet does not meet the development needs of the society in the future.

It has long been universally acknowledged that the Internet is structurally flawed. Even many documents in the United States government say a lot about it. For example, at the beginning of the Internet design, it did not anticipate the tremendous changes and security threats brought by the development of science and technology decades later. It did not embed security into the architecture design, and many network security problems were caused by the structural defects of the Internet. If you were to enumerate the structural flaws of the Internet, the list could go on and on.

Taking 《Future Network Architecture and Its Security》 research report written by Chinese academy of sciences in 2014 as an example, makes a comprehensive analysis of the defects of Internet architecture from the perspective of security, and summarizes dozens of security architecture design requirements and solutions. Taking the ISO/IEC international standard draft of 《Future Network Security Architecture》 written by Chinese experts as an example, there are 100 technical indicators to be realized in the future network architecture design alone. These indicators correspond to the structural defects of the Internet one by one. If you include structural defects in other technical areas such as naming, addressing, routing, infrastructure, economics, topology, management, and so on, there are hundreds of structural problems that need to be addressed.

However, the study of the "new architecture of the network" has long since passed the stage of Internet defect studies and feasibility studies. So there is no need to devote too much energy to responding to the IETF's objections.

III. THE FUTURE OF THE INTERNET LEADS THE WORLD

In the past two decades, there have been two ideological trends in the development of the network

technology system. One is the conservative approach stressed by Internet vested interests such as ISOC, ICANN, IETF and IANA that "the structural integrity of the Internet can only be maintained through gradual improvement". The biggest problem with this route is its inability to address structural flaws. Patch the method of "overlapping", security holes emerge in endlessly.

Another trend of thought has emerged since the beginning of this century, advocating a new approach, using the "empty cup design" method, a new blueprint for network architecture on a piece of paper, through a new architecture design to fundamentally solve the security problem. From China's ministry of information industry to establish a decimal network standard working group (2001), to the national science foundation GENI - FIND plan (2005-2006), to the future network international version of the ISO/IEC standardization project (2007), the ITU -t 13 working group (2008-2009), the future of the network, to the eu's "brad manifesto" (2008), the President of the United States national security telecommunications commission proposed "shot in the network security project" (2018), the Brics calls chairman Xi Jinping, To speed up the construction of "the Brics future network institute" (2019), and then to Huawei, China mail tunnels institute, China Unicom and China mobile "New IP" proposal, that a series of facts show that over the past two decades, the idea of network architecture reconstruction in China, the us, European and international standards organization has been a research hotspot and frontier technology in the field, has become an irresistible trend of the world.

In this world trend, the Internet standardization community will no longer hold a significant position. For Future Network (the Future Network, FN) as an example, the project is xi President called "the most authoritative international standardization organization" ISO/IEC organizations set up since 2007, currently has more than a dozen published planning technical report (ISO/IEC TR 29181 series), and are working on the Future Network architecture and protocol standard system (ISO/IEC 21558 and 21559 series standard).

As early as 10 years ago (2010), a member of a national body had written to ISO/IEC, claiming that the Internet standards were maintained by the IETF, and that the future network project violated the rights of the IETF, demanding that the project be stopped and withdrawn. On the basis of the position paper submitted by Chinese experts to ISO/IEC, ISO/IEC adopted the resolution that the future network is a completely new network system, which is not related to the Internet and does not fall within the scope of the authority of IETF, so there is no reason to stop or withdraw it. Subsequently, the TR 29181 series of technical reports, led by Chinese experts, received unanimous approval in a vote.

IV. THE NEW CYBER ARCHITECTURE WILL NOT HINDER GLOBAL CONNECTIVITY

Although the trend of reconstructing network architecture is irresistible, it still encounters great resistance and interference in the development process in the past. Whether it is international or domestic, Internet interest monopoly groups spread some wrong views through the media, misleading the decision-making and the public. If analyzed carefully, these views are all prejudices and fallacies, which simply cannot hold water.

For example, there is the "fragmentation" view that the new architecture of the network will lead to the fragmentation of the Internet and the "balkanization" of the Internet. But this view is groundless. Take the future network of ISO/IEC as an example. This is a brand new network system. It only considers the construction of its own system, but it will not touch the basic architecture and facilities of the Internet. The relationship between the future network and the Internet is like that between the new highway system and the old provincial and national highway system.

The construction of new highways will not hinder the survival and passage of old roads.

There is also a view that the new network will hinder globalisation and that countries will not be able to connect with each other. This, too, is a fallacy. Take the ISO/IEC future network as an example. It is a project organized by an international standardization body and actively participated by many countries in the world. It fully conforms to WTO norms and is recognized by the world. Not only developing countries will support it, but many developed countries are also optimistic about the project. In 2010, for example, the UK national committee submitted comments urging Chinese experts to submit technical proposals for future web naming and addressing as soon as possible. A telecom expert from the national association of France led the proposal to help China promote the new future network technology program to African countries. So, as long as the new network has clever design and application space, other countries will not be able to use it. It is an unreasonable assumption without any basis that other countries will not use it. There is ample evidence of this both in the historical literature of the international standards of the future web and in the previous summit declarations of Brics leaders.

There is a claim that, a new architecture of the network system will make the network investment benefit of telecom enterprises in the past suffered this view also belong to prejudice again in the future network, for example, France telecom has an expert in ISO/IEC has repeatedly stressed that the future network to consider good protect telecommunications enterprise's investment in 2009, Chinese experts to the ISO/IEC submitted a technical literature, in China a decimal network technology solutions, for example, suggests that the future network to ensure that the new network architecture independent complete and advanced nature, can also with the existing network connectivity, can protect the existing network investment Now that China Unicom and China mobile have joined Huawei's proposal, investment protection is no longer a concern.

Some people accuse China's independent innovation in the Internet system of "shutting the door on the outside world" or "narrow gauge train". This is typical idle talk and scaremongering. Take the future of the Internet as an example. It is an international standard. How can it become a "closed door"? In the future, the network international standard will have guidance and priority for adoption all over the world. Why is it a narrow-gauge train? The whole world has agreed on the future network planning scheme, almost all countries have the need for a new network architecture, how can it be impossible to gradually deploy and apply it globally? Moreover, the future network has already been designed to be compatible with the existing network and can be quickly deployed. Coupled with the advanced technology and full consideration of the application prospect, the future network has unlimited development potential.

V. NEW ARCHITECTURE FUTURE NETWORK RESEARCH AND DEVELOPMENT IN LINE WITH NATIONAL POLICY GUIDELINES

In Huawei's "New IP" proposal, it is clearly stated that this proposal belongs to the "future network" category. This enables Huawei's proposal to be strongly supported by future domestic network technology accumulation and national policies.

From the perspective of technology accumulation, China is the first country in the world to carry out the research on the new architecture network system. As early as the late 1990s, China has started the pre-research and tackling of the new network system, and has made technological breakthroughs and obtained patent and copyright protection. In 2001, the ministry of information industry of China set up the working group on decimal network standard, and soon promulgated the industry standard of "digital domain name specification" (2002). In 2004, when the

ISO/IEC JTC 1 / SC 6 Xi'an plenary session considered a future network standardization project with an entirely new architecture, China voted in favor. In the following ten years, China's national members have contributed a lot of technical documents to the future international network standards. The international standards committee, the ministry of industry and information technology and the China institute of electronic standardization have held several meetings to promote the future network standardization, and the central leadership has issued important instructions on many occasions. China is a major contributor to the naming and addressing and security solutions in the future network core technology areas. China voted in favor of the future of Internet international standards. Therefore, it is the national position of the People's Republic of China to establish a new architecture network system based on international standards. This position admits of no challenge.

In terms of domestic policy, the Chinese government has always attached great importance to the future research and development of network technology. As early as 2013, the state council announced in document no. 8 that the gradual improvement of the Internet based on TCP/IP could no longer meet the needs, and that it was necessary to break through the basic theory of the future network, build future network experimental facilities, and incorporate the future network into the national medium - and long-term science and technology planning. In 2015, after a year-long investigation, the Chinese academy of sciences submitted a report to the state council, recommending the establishment of major national projects to promote future network research and development with the will of the state. In 2017, the general office of the CPC central committee, the general office of the state council, the cyberspace administration of the CPC central committee, the state standards commission, the ministry of science and technology, and the commission of science and technology of the central military commission all released documents, listing the future network as one of the key technology areas that are "forward-looking, subversive and killer" during the 13th five-year plan period. In 2019, at the brics informal summit in Osaka, Japan, President Xi Jinping proposed to speed up practical projects such as the brics future network institute.

In such a situation, our country's scientific research institution should keep highly consistent with the party central committee and the State Council, the propaganda department and the mainstream media should also be clear to defend persevere in the position of network sovereignty, avoid becoming the Internet interests abroad monopoly the mouthpiece of the group to maintain its backward system, not for our country in the future, a new architecture of sovereignty for the construction of network system.

VI. IT IS URGENT TO REBUILD THE NEW SYSTEM AND ACCELERATE THE SOCIAL BUSINESS APPLICATION

President Xi Jinping has always stressed that core technologies cannot be acquired. We need to adhere to independent innovation to change the situation that core technologies in the field of information are controlled by others. In his remarks during the 2019 cyber security publicity week, Xi Jinping called for equal emphasis on governance and innovation in cyber security. In his speech at Davos 2019, vice chairman Wang mentioned innovation seven times. "We can only find ways to better slice the cake as we make it bigger," and said. "we can't stop and argue endlessly about how to cut the cake. Shifting the blame to others will not solve the problem.

We now can completely don't have to dwell on the right and wrong of the Internet, and should make full use of the new infrastructure network system reconstruction strategic opportunities brought by the international trends, build a new architecture of the network system of big cake, establish complete sovereignty of network new space for the future in our country, and then lift force of the country, the

construction of new cyberspace into an exempt from cyber threats, with endless resources, people's safety work and future generations of survival in the new world, new frontiers and new paradise. This will be a great cause in the present and future. The use of innovation to develop the network technology system is a sovereign state's right to survival and development, no country has the right to interfere.

The urgent task of advancing this cause is to accelerate the development of international standards for the future network. Huawei's dispute with the IETF over "New IP" is further proof of the importance of international standards. We are developing a new architecture not just to protect ourselves, but to address the urgent need of people around the world for equal sovereignty and a secure network. International standards are not only a platform for technical exchanges among countries on the new network technology system, but also a bridge for China's future network system plan leading the research and development to the world. Although China has made proud achievements in this field, there is still much work to be done to form a complete system of future network technology standards. In particular, the future network security architecture based on the new design of the international standard scheme is the key factor of the future network success or failure is the future network crown jewel. In this field, China has achieved world-leading results, and more national resources are needed to integrate it into the future network international standard system. In the environment of increasingly fierce competition for international standards in network system, enterprises will lose precious opportunities if they are allowed to face the competition of "full government power" from other countries.

At the same time, China should urgently promote the practical deployment of the new architecture of the future network technology system. The expected commercial time of future Internet international standard is 2020. Because our country starts in this domain early, already had the ability that invests commercialize now. This preparation includes not only standards and equipment, but also application scenario design. The Internet of things is the biggest application scenario of the future network. The Internet of things based on the new future network architecture has been issued by the ministry of commerce and the ministry of industry and information technology in 2002, 2010 and 2016 respectively. Due to the advantage of being a late starter, China's future Internet of things technology is more in line with the application of the Internet of things. From the perspective of social research, there is a very urgent and widespread need.

In the increasingly severe international situation and the increasingly imminent threat of cyber warfare, accelerating the deployment of China's autonomous and controllable future network is no longer an option, but a necessary option. The spread of covid-19 in the us and Europe has led to growing calls from western anti-china forces for China and the us to decoupled, a trend that is bound to spread to the cyber sector. We need to consider the question: what if the network decouples? Are we ready? This problem is not only Huawei will face, but also the difficult problem that people all over the country can not avoid.

VII. CONCLUSION

The "structural flaws in the Internet" proposed by Huawei in its "New IP" international standard proposal is a universally recognized fact that cannot be changed even if the IETF denies it. The proposal was submitted to the international standards organization. The IETF has comments that can be submitted to international institutions through its national membership. Huawei's idea and proposition of "rebuilding the network architecture" fully conform to the position of ISO/IEC international network standards in the future, which has been repeatedly demonstrated for 13 years, and its rationality and feasibility have been unanimously approved by the international community. The IETF's

position reflects its desire to protect the interests of the Internet, but whether it meets the needs of people around the world needs to be evaluated and considered in international standards bodies. The ISO/IEC one country, one vote decision-making mechanism is the best mechanism to ensure the sovereign equality of all countries and the fairness of the world.

The route of "rebuilding network security architecture" represented by ISO/IEC future network international standard has been the trend of the world, representing the most important field and direction of the future development of information and communication technology in the world, and has reached the stage of commercial construction. The future network is a frontier technology field which the Chinese government attaches great importance to. Its technical scheme has been recognized by the world and has a wide application prospect in the world. The future network will sui generis, don't have to rely on existing network infrastructure support, but for the rapid deployment and application, the design with the existing network compatibility mechanism, will not affect the structure stability of the Internet, not push the fragmentation of the Internet, will not endanger the telecom enterprises existing investments, will not lead to a "closed" or "narrow gauge train" phenomenon. In the future, the network also has new core resources with great industrial value, which can drive huge social and economic value and industrial development space.

"Ten years to sharpen a sword". The future of our country network is twenty years, in the theoretical study, the top design, the international standard, the system scheme, the security architecture, autonomous control, the core equipment, sovereign legislation, offensive and defensive drills, and strategic planning, etc, have mature solution, prepared and available equipment system, can be said to be the everything is ok, only owe the east wind. The investment of Huawei and other organizations indicates that the future network is on the fast track of development.

At present, the international situation is very serious, and the threat of national-level cyber confrontation and cyber warfare is increasingly imminent. It is an urgent task to strengthen the construction of the national network security defense system with the new architecture of the future network technology system. In the past, there have long been differences in the development path of the network system, but there has been a growing consensus to rely on the new architecture of the network to strengthen national cyber security. We should seize the opportunity, give priority to national and national interests, discard past grievances, unite all forces that can be united, form the broadest possible united front, and accelerate the construction of a new architecture for future network standardization and social and practical deployment.

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