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Comparative study of Internet Protocol

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ABSTRACT -- In today's generation, most of today's Internet is using IPv4, Now twenty years old. IPv4 is now uploading with the Problem of meeting growing Internet requirements and it is a shortage of IPv4 addresses, which are necessary for all new the machines added to the Internet.IPv6, fixes a series of problems In IPv4 addresses. It also adds many improvements to IPv4 and provides a better network. IPv6 is expected to gradually replace IPv4, with the two coexisting for several years during a transition period.

As the population is increasing day by day, similarly the Internet isAlso growing and expanding more and more and more and more,Government, scientists and universities are looking for new waysTo send information quickly and powerfully The two new InternetsDevelop new and faster technologies to improve research andCommunication, and both projects are expected toEventually improve the current commercial Internet. A big advantage of IPv6 is that it simplifies and solves the problem. The scarcity of IP addresses. In today's Internet technology, Controls in the United States 74% of the 4 million IP addresses, while the amount that China has is equal only to the University California, but its share of 80 million users. This is the main reason Asian countries, especially China, Japan and South Korea, Show interest in IPv6 version technology.

Keywords:

IPv4, IPv6, Internet,Sub netting, bandwidth

Introduction:

IPv4 static IP addresses only the amount of the delivery address and therefore does notnew machines connected to the Internet during the IPv6 versionit offers an almost infinite number of IP addresses that can benew computer systems[1]. Scarcity of IPv4 addressesRestricts address space also enter applications,Innovative new services that can be implemented inBusiness and home networks. Without sufficient address space,the applications are forced to work in a very complex environmentwith mechanisms that provide local addressing, such as IPConvert the address, and the collection and temporary allocation techniques. The current Internet cannot support a number of important issues,Including the national security and economic competitiveness andGoals. Perhaps the hallmark of the next generationThe Internet is fast, this generation of the Internet is primarily launchto accommodate the growing traffic and increase bandwidthDemand to match the speed of the Internet at a high level[2]. In addition,Expansion in the number of Internet addresses, the next generationInternet solves the problem of the connection is busy signalsstreaming video and audio quality

IPv4 over IPv6

The reason may be necessary to change from IPv4 to IPv6 isbecause the world's population. The rate at whichthe world population is growing something to look down.In the future, it will be connected to all vehiclesUse OnStar or other navigation devices and thoseyou need IP. Therefore, in the end we need more

IP, the number we have now. IPv4 is the fourth version of the Internet Protocol, but for the first timeOne to be deployed on a large scale [3]. It uses 32-bit addressing andit allows 4,294,967,296 unique addresses. IPv4 addresses fourTypes of different categories and types of classes are A, B, C and D.Example 207. 142. 131. 235. IPv4 is used IPv4Subnet mask due to the large number of teamstoday. IPv6 is the next in pushing the wheel of intellectual property. Although itVersion 6 will probably be the nextInternet protocol. Compared to IPV4 allowedOnly 4,294,967,296 unique addresses, IPv6 version using

The order will be 340 undecillion 128-bit (34, 000 million,000 million, 000 million, 000 million) this figureBig to the point that there are more stars in the unique IP addressesthe universe as we know it. However, IPv6 has not come tountil 2025 at least because it needs time to fix errorsThe Protocol. IPv6 is an example:131. 235. 207. 142. 207. 142. 131. 235. 207. 142. 131.235.207. 142. 131.235.

Features and differences between IPv4 and IPv6

In most aspects of IPv4 is an expanded version of IPv6 Top ReleaseImprovement. Nevertheless, there are still a lot of differences betweenIPv4 and IPv6 [4].

- **Trends:** the IPv4 and addresses are 32 bits (4 bytes) in sizeWhile in IPv6 is to increase the maximum size of 128 bits (16Bytes). Thus, IPv6 version has more ability to store data in comparisonAnd IPv4 addresses.
- **Set:** The manually configure IPv4 addresses or via DHCPWhile not support IPv6 to be configured
- There is one hand.
- **Auditing:** In the IPv6, header includes a test version while IPv6Head does not contain a checksum
- **Fragmentation:** all routers and fragmented data senderswhile in IPv6, routers do not support packagesIndivisible. The only sender's fragmentation of data packets.

IPv6 Header Format:

The form of IPv6-to-head is shown in Figure 1. Note thatalthough the IPv6 addresses are four times the size of IPv4 addresses,Basic IPv6 header is only twice the size of the head of IPv4 andreducing the impact of major administrative areas. The fields Of the IPv6 header are:

Version: The version number IP (4 bits). The value of this field is six forIPv6 version (and four IPv4) for. Note that this area is in the same locationSuch as a copy field in the header IPv4, which is a simple Intellectual PropertyKnot to distinguish quickly package from IPv4 to IPv6Package [5].

- **Priority:** allows the source to identify the desired deliveryPriority for this package (4-bit).
- **Label Flow:** used by the source to identify the associated packagesyou need the same kind of special treatment, really likethe time between a pair of hosts (24 bit).
- **Payload Length:** The length of loadthe head of the next packet) in bytes (16 bits). This maximum value in this area is 65535. If this area containedZero means that the package contains the largest load This is 64 KB, and the length of the actual value of the load inJumbo option payload leap to jump.
- **Next head:** The head directly determines the type After the IPv6 header. It uses the same values as the IPv4 addresses Protocol field, as appropriate (8-bit). Then head the presence of the best options area may indicate, the upper layer protocol, or Any IP protocol over.

Hop Limit: Specifies the maximum number of jumps thata packet can be taken before it is dropped (8 bits). ThisValue is set by the source and decremented by one for eachNode sending packet; the package is discarded ifthe jump limit reaches zero. The comparable field inIPv4 is the Time to Live (TTL) field; It was renamedIPv6 because the value limits the number of hops, notthe amount of time a packet can remain in the network.Source address: IPv6 address of the originator of thePackage (128 bits). Destination address: Recipient's IPv6 addressPacket receiver (s) (128 bits).

IPv6 Addresses Format

To accommodate the growth, almost limitless, andAddresses, IPv6 addresses are 128 bits long. This address space is probably enough foreach molecule in solar. IPv6 system is an extension forIPv4 with more space to store huge data addressesand it is known as the three types of IPv6 addresses [6]. Unicast title

Select one host Unicast address is the one thatSet to interface more than one, usually belonging ofHeld various IPv6, and a group of routers subsidiaryISP. The package sent to a different delivery address for transmissionRouters defined by this title which, usually "closer"One as defined in the routing protocol. Multicast addressit also identifies a group of soldiers. The package sent to the transmitterDelivered to all hosts in the group title. Note thatthere is no broadcast address in IPv6, IPv4, asmulticast addresses are written in IPv4 provides it dotted decimal notation, where addressesDecimal value of each of the four bytes is the titleSeparated by dots. Preferred basis, or regular, a version IPv6It is to write a hexadecimal value of eight-bit 16-bitTitle blocks, separated by a colon (:), asFF04: 19: 5: ABD4: 187: 2C: 754: 2B1. Note that leading zerosand to be written, and that each field must bethe value [7].Often it contains IPv6 long strings of zeros addressesthis is due to the way it is set addresses.Abbreviated form of compressed address or use a double colon(: :) To refer to multiple blocks of 16 bits of zeros. For example,

Zero: 0: 0: 0: 0: 0: The 5A FF01 address can be writtenFF01: 5A. To avoid ambiguity, and ":" can be one-time only showin one direction.Finally, the alternative was a hybrid form titleDefinition to represent IPv4 addresses more convenientIn an IPv6 environment [8-35]. In this scheme, the first 96 it is represented by the address bit (six groups of 16) in the normal version of IPv6the shape and direction of the remaining 32 bitsCommon IPv4 addresses decimal spread. For example,0: 0: 0: 0: 0: 0: 199.182.20.17 (or: 199.182.20.17) [36-43].

ICMPv6

Whenever data is transmitted from the sender to the receiver, and if not can access the data at the receiving end for some reason, ICMPv6 always sends an error message that says the status and message ICMP (Internet Control Message Protocol) on the wrong information that is outside the scope of intellectual property messages. ICMP for IPv6 (ICMPv6) resembles functionally for ICMP for IPv4 uses a similar message format, and an integral part of IPv6 version. ICMPv6 messages are in version Datagram IPv6 worth 58 Next header fields [10].

ICMPv6 error messages are:

- Unreachable destination: sent when the packet cannot be sent to its destination address and other causes of congestion
- A very large packet: Sent by a router when you have a packet that you cannot forward because the outgoing packet link larger MTU
- Derivation time: Sent by a router when the cadence packet reaches zero or if it is not receiving all parts of the datagram, in part, the time reassembly
- Parameters: A problem is sent by the node that encounters some problems in the field in the header of the packet, which results in the inability to face the head).

IPv6 SECURITY

As use of the Internet, it is also increasing, so more risk of data leakage so that maximum safety happens. Although many of the existing TCP / IP applications have, their own security mechanisms Although many of the existing TCP / IP applications have their own security mechanisms, and many would argue that security should be implemented at the lowest possible layer protocol. IPv4 was little or no security mechanisms, authentication mechanisms and protocol layers less Privacy largely absent. IPv6 has created two security systems in the underlying protocol. The first mechanism is the IP Authentication Header (RFC 1826), an extension of the head that can provide integrity and authentication of IP packets. Although it accepts many different authentication methods, using the Message Digest Algorithm 5 (MD5, RFC described in 1321) to ensure interoperability is required. Using this option may the elimination of a large number of network attacks, and IP addresses to deceive. This will also be important to overcome some of the security weaknesses of IP source routing supplement [11]. Host IPv4 addresses does not provide authentication. All you can do in IPv4It is to provide a host sender and advertised by titlesend the host to the IP datagram. Host authentication modethe information contained in the Internet layer in the high availability of IPv6Protection for top layer services and protocols that are currentlythe documentation processes were meaningless.The second mechanism is IP security payload packing

(Described in RFC 1827), at the top of the extension, which can beProvide integrity and confidentiality of IP packets. , Although theDefinition ESP independent of an algorithm, and data encryptionthe normal mode using a zero-restrict block (DES-CBC) isas defined in the standard encryption system to ensureInteroperability. In addition, ESP can be used for the encryption mechanismthe entire IP package (Tunnel ESP) or simply place a top layerPart of the payload (ESP mode of transport).This adds to the secure nature of features while IP trafficMania minimizes the security effort. It is done in the documentationEnd-to-end provided during the session based on the FoundationMore secure communications even in the absence of a firewallRouters. Some have suggested that the need for firewalls will beAvoid using a wide range of IPv6 and despite the absence ofthat evidence to present yet.

CONCLUSION

When to choose IPv6a golden rule says to "never touch a running system." This rule applies to your IPv4 networks. As long as they do what you need them to do, let them run. However, when an IPv4 network hits the limits for some reason, choose IPv6. IPv6 is mature enough to be used in corporate and commercial networks, as many case studies and deployments worldwide show. High investments in new IPv4 setups, fixes, or complex configurations for IPv4 (especially NATs) should be avoided if possible because they are investments in a technology that will slowly be phased out. When you reach the point where this becomes necessary, evaluate IPv6. Whatever you invest in IPv6 is an investment in future

Technology. As you can see in the findings of people who present

Their case studies, getting familiar with the new protocol early, taking some time to play with it before you really need it, and planning for it early saves a lot of cost and headaches. Here is the list of indicators that it may be time for you to consider or integrate IPv6:

- Must be fixed network from IPv4 to have or perform NAT or expanded.
- He worked from the address space.
- Want to prepare the network for applications based on advanced features of IPv6 applications version.
- A safety end is required to stop a large number of Users do not have, or address space, Conflict with NAT implementation.

It is unacceptable for the next generation of Internet around the world in severalSectors such as business, business, education, etc. in 2002Long feasibility study was carried out over a period of three months,IGN to the New Zealand verification network. The resultthe report, entitled "Cooperation swiftly: InnovationInfrastructure for a Knowledge Economy ", one of the firstthepriorities of the report is the establishment of NGI-NZ(Now in the community) to provide the national high-speed networkand international NGI networks.

So also, China Education and research Network otherwise called CERNET2 is likewise the principal organize in light of unadulterated Internet Protocol Version 6 (IPv6) innovation, one majorcharacteristic between the ebb and flow Internet and the cutting edge Internet.CERNET2 is the greatest cutting edge Internet arrange in the operation on the planet and associates 25 colleges in 20 urban communities. The speed in the spine arrange achieves 2.5 to 10 gigabits for each second and interfaces the colleges at a speed of 1 to 10 gigabit for each second. The 2008 Summer Olympic Games were an eminent occasion regarding IPv6 sending, being the first run through a noteworthy world occasion has had a nearness on the IPv6 Internet at http://ipv6.beijing2008.cn/en (IP addresses 2001:252:0:1::2008:6 and 2001:252:0:1::2008:8) and all system operations of the Games were led utilizing IPv6. It is trusted that the Olympics gave the biggest feature of IPv6 innovation since the beginning of IPv6Cellular phone frameworks show a substantial arrangement field for Internet Protocol gadgets as cell phone administration is being transitioned from 3G frameworks to people to come (4G) advances in which voice is provisioned as a Voice over Internet Protocol (VoIP) benefit. This orders the utilization of IPv6 for such systems because of the looming IPv4 address weariness. In the U.S., cell administrator Verizon has discharged specialized details for gadgets working on its future systems. The determination commands IPv6 operation as indicated by the 3GPP Release 8 Specifications (March 2009) and expostulates IPv4 as a discretionary ability.

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