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The IPtX Dynamic Host Configuration Protocol (IPtX DHCP), and the Requirements for the 'IPtX' IP Addressing Protocol 'Family' Specification

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Abstract

This document defines the changes when the IP Bit Mapped Header Size Specification Equals 64 Bits, as would be required for the Implementation Dynamic Host Configuration Protocol (DHCP) to support hosts defined by the IPtX IP Addressing Protocol Family Specification. Furthermore, while the underlining implications regarding any Change in the Header Size Specification maintains the possibility of having a Profound Cascading Affect upon other Protocols. Noting specifically, the affects upon the 'TCP' and 'UDP' Headers, and the corresponding affects upon the Growth in the Number of Available 'PORTS'. Nevertheless, while there is a noticeable growth occurring in each of these areas, they remain manageable, because the difference between the IPv4 and the IPtX Specification is minimal. In which case, it should be clearly understood, the Operations presently defined for the IPv4 IP Addressing System would be the same under the IPt1 Specification. And this is valid because the differences between their IP Addressing Schematic Design does not mandate a requirement for any change, and they both use the same 32Bit Header Size Specification.

In other words, the implementation of the IPtX Specification has little or No affect, nor does it constitute an appreciable change in the Dynamic Host Configuration Protocol Specification, which is Currently used in the IPv4 IP Addressing System. Hence, this work should only be considered as an extension of the RFC(s) governing and supporting the Dynamic Host Configuration Protocol (DHCP) for the IPv4 Specification, because the only objective this paper maintains, is the development and presentation of the IPtX DHCP Specification, which only compliments the requirements in the current RFC(s) defining the DHCP Protocol Specification.

"This work is Dedicated to my first and only child, 'Yahnay', who is;
the Mover of Dreams, the Maker of Reality, and the 'Princess of the
New Universe'. (E.T.)"

Chapter I: Current Specifications: The IPv4 DHCP Server and the IPt1 Specification

The acronym 'DHCP' is the abbreviation for 'Dynamic Host Configuration Protocol', which is an Application Protocol used to Automate the Assignment of the Network; Information, Connection, and Configuration of the Host, or Devices (Node) for their Connection to the Network representing their Network Domain.

Nevertheless, quoting the current definitions from the Introduction given in RFC2131 [8]:

"The Dynamic Host Configuration Protocol (DHCP) provides configuration parameters to Internet hosts. DHCP consists of two components: a protocol for delivering host-specific configuration parameters from a DHCP server to a host and a mechanism for allocation of network addresses to hosts.

DHCP is built on a client-server model, where designated DHCP server hosts allocate network addresses and deliver configuration parameters to dynamically configured hosts. Throughout the remainder of this document, the term "server" refers to a host providing initialization parameters through DHCP, and the term "client" refers to a host requesting initialization parameters from a DHCP server."

Nevertheless, while I could continue quoting from the various RFCs outlining the requirements for the DHCP Services [8]. The point to be made however, is that; since there is absolutely No change with the implementation of the IPt1 Specification from that required by the IPv4 Specification, it would be redundant to continue. In other words, barring the differences in their respective Addressing Schematics, these IP Addressing Specifications are Mirror Images, which represents an identity allowing for complete compatibility, because these IP Addressing Systems use the Same Default IP Addressing Structure / Format.

Figure 1

IP Header for IPv4

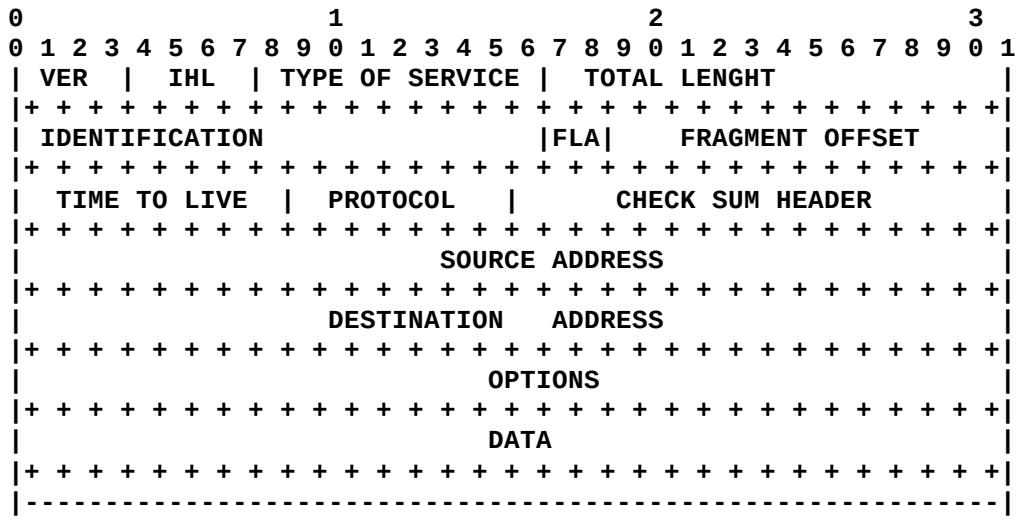


Figure 2

IP Header for IPt1

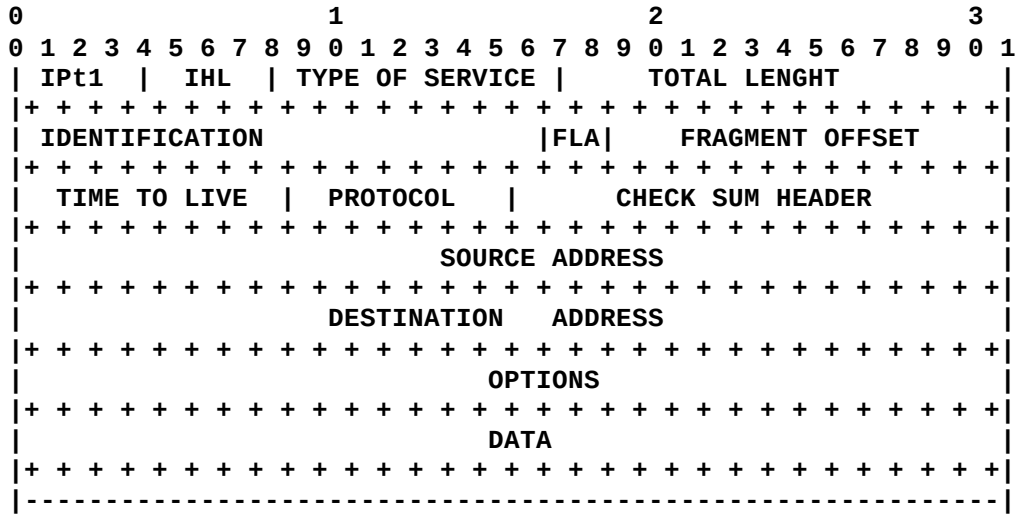


Figure 3

DHCP or Bootp Header for IPv4 and IPt1

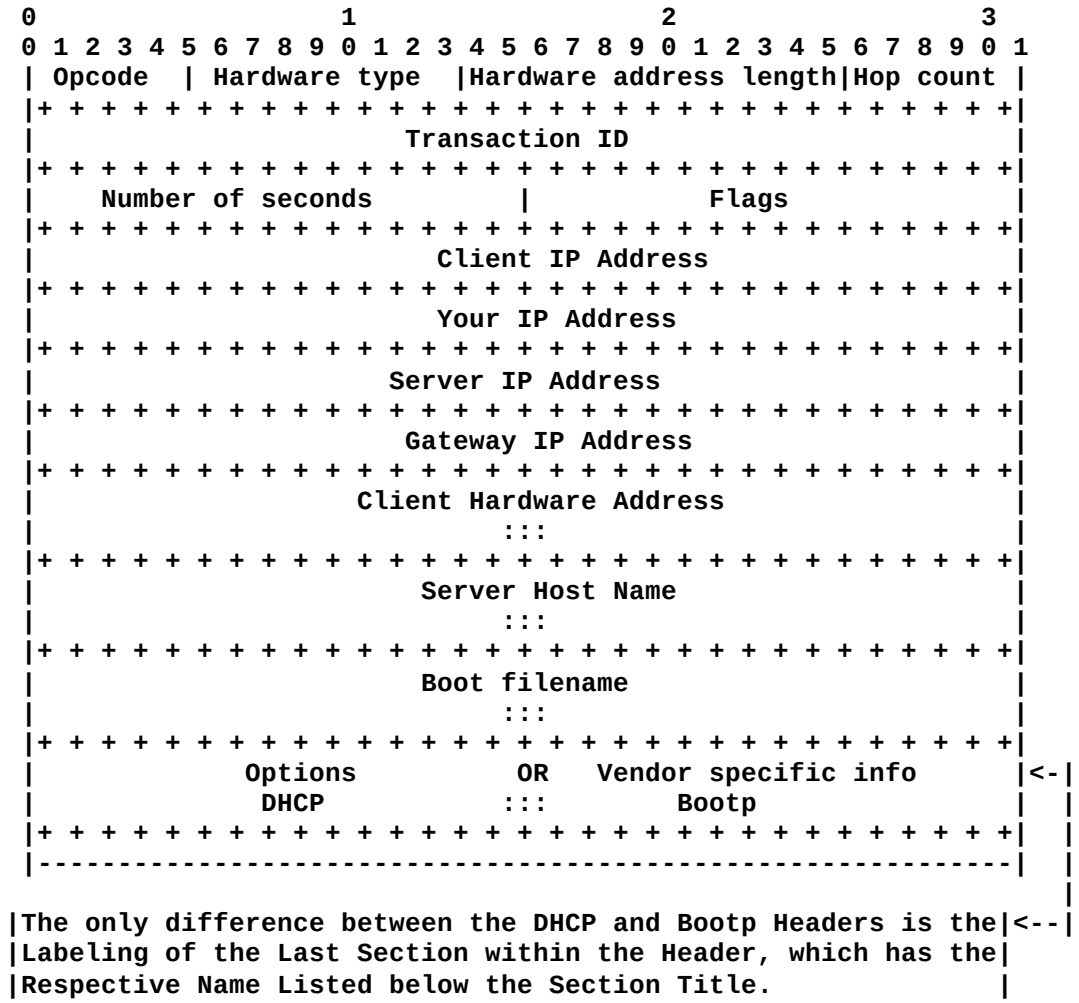
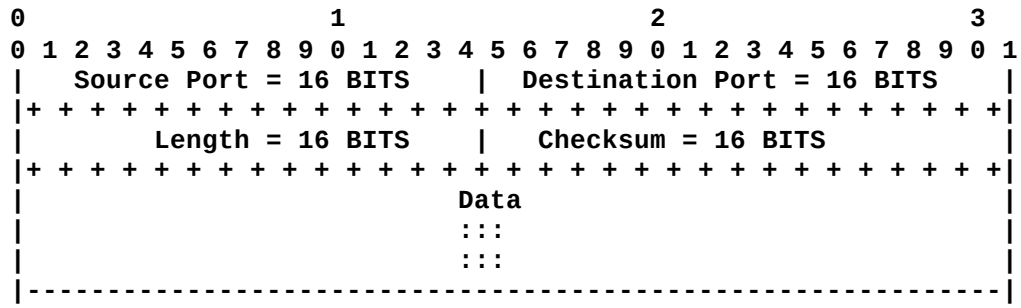


Figure 4

UDP header for IPv4 and IPt1



Chapter II: The IPtX DHCP Specification, and the Implications of the 'Zone IP', and 'IP Area Code' Prefix Addresses

The IPtX DHCP Specification, using a 64 Bit Header Size Format, should only be viewed as an Extension and Enhancement of the current DHCP Services used in the IPv4 Specification. That is, while preserving the Foundational Functions and Definitions, which governs and services the IPv4 Specification. The implementation of the IPtX DHCP Specification should only be viewed as extending the Size Parameters, as would be necessary to accommodate the 64 Bit Header Size Specification. However, there are consequences, foreseen and unforeseen, which are Directly associated with the IP Header Size Specification, that can Directly and Indirectly maintain dire effects cascading across the entire system. In fact, it could quite easily be the conclusion; 'Any IP Header Size Specification beyond 64 bits, would have Unmanageable Consequences Prorogating throughout the entire IP Addressing System'. These consequences would maintain such a profound effect, that the only way to Reduce the Adverse Impact resulting from Changing the Header Size Specification, would be the development of New Specifications for the affected Areas within the IP Addressing System. Even still, this procedure might not Suffice. However, a Temporary Fix could sustain the overall Addressing System from a Cycle of Continuous Break-Downs and Repairs, Until the Entire System Could Be Re-Written.

As an example nevertheless, consider the Growth in the Number of Ports Available, which is one of the consequences resulting from, and directly effected by the Header Size Specification, as shown in Table 1.

Table 1 [5]

1. When the Header Size Specification equals 64 BITS

   A. Total Number of Available Ports using the Modern Binary System for the Current or IPtX Specification

      $$255^4 = 255 \times 255 \times 255 \times 255 = 4,228,250,625$$

   B. Total Number of Available Ports using the New Binary System for the Current or IPtX Specification

      $$256^4 = 256 \times 256 \times 256 \times 256 = 4,294,967,296$$

2. When the Header Size Specification equals 128 BITS

A. Total Number of Available Ports using the Modern Binary System for the Current or IPv6 Specification

255^8 = 255 x 255 x 255 x 255 x 255 x 255 x 255 x 255 = 1.787810 x 10^19

17,878,100,000,000,000,000 = Number of Available PORTS

B. Total Number of Available Ports using the Modern Binary System for the Current or IPv6 Specification

256^8 = 256 x 256 x 256 x 256 x 256 x 256 x 256 x 256 = 1.844674 x 10^19

18,446,740,000,000,000,000 = Number of Available PORTS

3. When the Header Size Specification equals 32 BITS

A. Total Number of Available Ports using the Modern Binary System for the Current or IPv4 Specification

255^2 = 255 x 255 = 65,025

B. Total Number of Available Ports using the New Binary System for the Current or IPv4 Specification

256^2 = 256 x 256 = 65,536

The ramifications comprising the consequences resulting from the effects of changing the HEADER Size Specifications, to say the very least, are clearly profound. And while Table 1 demonstrates the need to exercise caution when specifying the HEADER Size Specifications, there can still be benefits. That is, if the all of the parameters within or effected by the resulting Growth of the Header Specification [1], which are effected or Changed by a proportional amount, and remain Stable and Manageable. Then the benefits derived from the IPtX Specification, using only the 'Zone' IP Address for differentiation, provides the ability to Assigning Port Numbers for Private use by the Consumer, which could have the affect of providing additional Security to allow Secure and Private access to Control Networked Appliances (Household Appliances, and other Networked Devices), or linking Wireless Remotes for sharing the Carrier Wave of Radio Frequency Transmissions. This method, which is similar to the VPN, or ATM(s), could also provide Secure Links for Commercial, Governmental, Medical, Educational, Research, and Military uses within each Zone IP Address Location, because there are more than 4 Billion Ports available to each Zone IP Address Location. And while after configuration, these Ports could be invisible to the User(s), the flexibility for Access could still be controlled, and the level of Security they provide, could be greater than the Firewall Technology currently used today.

Nevertheless, the IPtX DHCP Specification represents only the changes that are required by the 64 Bit Header Size Specification [1], which are reflected by Changes Noted in Table 2, and described in Figures 5 through 7 as being a proportional increase relative to the increase in the Header Size. In other words, the IPtX DHCP 64 Bit Header Size Specification reflects a uniform increase of the Controls within the Header itself, which provides an easy transition for backward compatibility with the IPv4 DHCP Specification.

Table 2

CHANGES: IPtX DHCP and Bootp Services 64Bit Header

DHCP Header for IPt2	BootP Header for IPt2	UDP Header for IPt2
Hardware Address Length = 16Bit	Hardware Address Length = 16Bit	Source Port = 32Bit
		Destination Port = 32Bit
Opcode = 16it	Opcode = 16Bit	
		Length = 32Bit
Hardware type = 16Bit	Hardware type = 16Bit	
		Checksum = 32Bit
Hop Count = 16Bit	Hop Count = 16Bits	
Transaction ID = 48Bit*	Transaction ID = 48Bit* {48 Bit HEX Number}	
Number of Seconds 32Bit	Number of Seconds 32Bit	
Flags = 32Bit	Flags = 32Bit	
*Network Security Identification Number = 'NSID'	*Network Security Identification Number = 'NSID' = 16Bit {16Bit Hidden Hex Number assigned by Operating System Server to Secure IPtX DHCP Services}*	

Figure 5

64 Bit IP Header for IPt2 [1], [4]

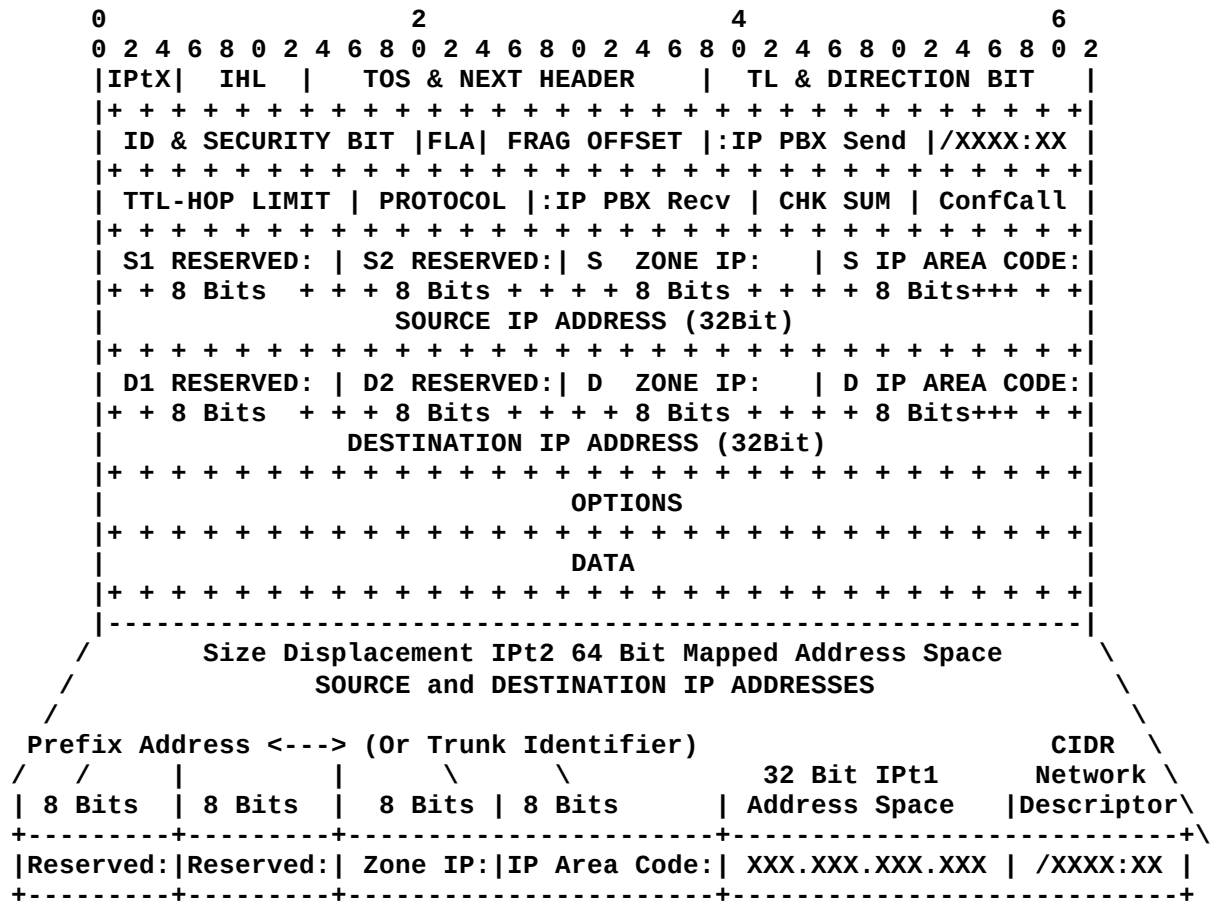


Figure 5-B [1], [4]

‘Reality of the IP Addressing Format in the 64 Bit Header’
'Whose Reserved Addresses would not be apart of the Software Program representing the Header'

1. Source Address Structure: (X.X.X):(X.X.X):256:256:256.256.000.000

2. Destination Address Structure: (X.X.X):(X.X.X):256:256:256.256.000.000

Note*: While the expansion of the IP Address within the Header, is incremented in '8 Bit' Segments. The increase in the Total Size of the IP Address beyond the Current Header Specifications, is accomplished using '32 Bit' increments, which increases the overall size of the Header itself. This is, as it should be, because it reflects the size of the 'Base IP Addressing Schematic'; 'IPt1'. Thus, preserving the Logic and Mathematical Continuity, which is the actual integrity of the System's Foundation, that was logically derived from the Mathematics of Quantification.

Figure 6

DHCP or Bootp Header for IPtX

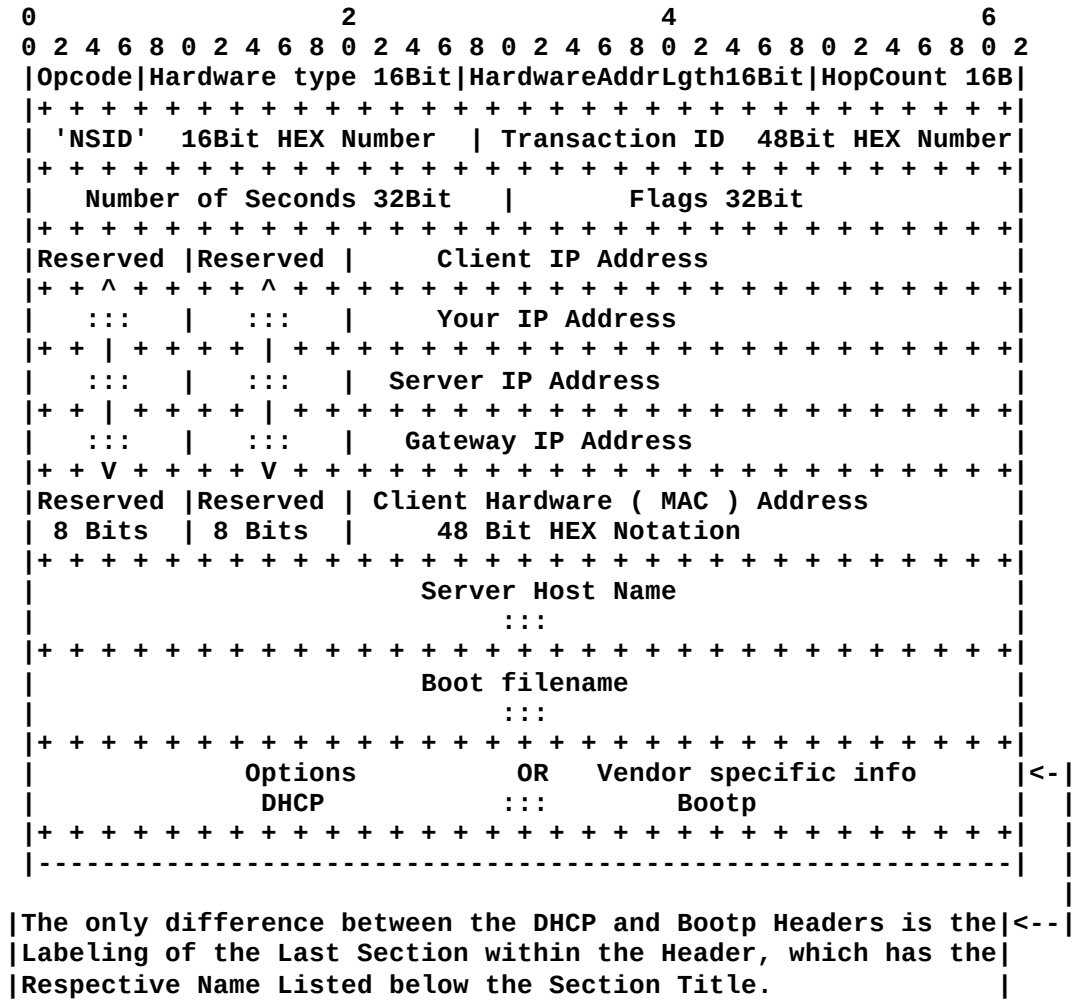
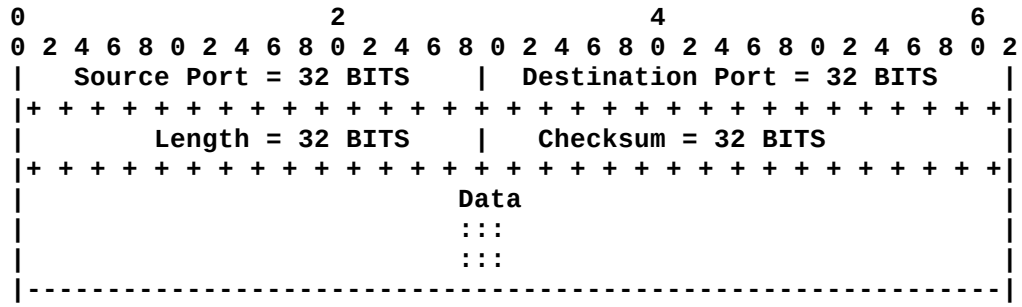


Figure 7

UDP header for IPtX



Nevertheless, while triggering the Alarm, as shown by the analysis of the data in Table 1, might seem more like a scare tactic. It is in fact, a call for an investigation regarding the Size Limits, which should be imposed upon the Growth of the Header Size Specification used in any IP Addressing System. Furthermore, the data analysis resulting from Table 1 is indeed indicative of the Cascading Consequences effecting every Protocol, who's Length is Derived from the Header Size Specification. Moreover, while the IPtX IP Addressing Protocol Family Specification maintains an Unlimited IP Address Size Specification, the built in constraints it maintains, Limits the Header Size Specification to 64 Bits [1], which provides a more Rational, Stable, and Manageable approach to IP Addressing. In other words, once the Parameters has been Adjusted for the 64 Bit Header Specification, with the exception of IPt1, the parameters remain valid throughout the remaining IPtX Addressing Protocols contained in this IP Addressing Protocol Family Specification.

Chapter III: Security Considerations [8]

This document, whose primary objective was the Development of the IPtX DHCP Specification does not Challenge the Security Procedures specified for the Current DHCP Specification. However, DHCP was intended to make maintenance of remote and diskless Clients automatic. And while it may be difficult and inconvenient, the configuration of passwords and authorization keys, so far, remains the only option. Nevertheless, since the DHCP Services is inherently insecure. The provisions for a 'Network Security Identification' (NSID) Number, which is a Hidden 16Bit HEX Authorization Number Assigned by the Operating System Server to the DHCP Server, that could be verified and confirmed by the client during Logon with the Network Domain Server after configuration. Would clearly be a Boon for the prevention of the Rogue DHCP Services, which are masquerading as a DHCP Service attached to the Network Domain. Needless to say, this feature would be a significant enhancement over the Security features currently Specified for the IPv4 DHCP Specification, and could quite easily be employed in the New Specification for the IPtX DHCP Services.

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