RFC 768 J. Postel

ISI

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User Datagram Protocol 用户数据报协议

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Introduction

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This User Datagram Protocol (UDP) is defined to make available a

datagram mode of packet-switched computer communication in the

environment of an interconnected set of computer networks. This

protocol assumes that the Internet Protocol (IP) [1] is used as the

underlying protocol.

This protocol provides a procedure for application programs to send

messages to other programs with a minimum of protocol mechanism. The

protocol is transaction oriented, and delivery and duplicate protection

are not guaranteed. Applications requiring ordered reliable delivery of

streams of data should use the Transmission Control Protocol (TCP) [2].

Format

------

0 7 8 15 16 23 24 31

+--------+--------+--------+--------+

| Source | Destination |

| Port | Port |

+--------+--------+--------+--------+

| | |

| Length | Checksum |

+--------+--------+--------+--------+

|

| data octets ...

+---------------- ...

User Datagram Header Format

Fields

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Source Port is an optional field, when meaningful, it indicates the port

of the sending process, and may be assumed to be the port to which a

reply should be addressed in the absence of any other information. If

not used, a value of zero is inserted.

Postel [page 1]

28 Aug 1980

User Datagram Protocol RFC 768

Fields

Destination Port has a meaning within the context of a particular

internet destination address.

Length is the length in octets of this user datagram including this

header and the data. (This means the minimum value of the length is

eight.)

Checksum is the 16-bit one's complement of the one's complement sum of a

pseudo header of information from the IP header, the UDP header, and the

data, padded with zero octets at the end (if necessary) to make a

multiple of two octets.

The pseudo header conceptually prefixed to the UDP header contains the

source address, the destination address, the protocol, and the UDP

length. This information gives protection against misrouted datagrams.

This checksum procedure is the same as is used in TCP.

0 7 8 15 16 23 24 31

+--------+--------+--------+--------+

| source address |

+--------+--------+--------+--------+

| destination address |

+--------+--------+--------+--------+

| zero |protocol| UDP length |

+--------+--------+--------+--------+

If the computed checksum is zero, it is transmitted as all ones (the

equivalent in one's complement arithmetic). An all zero transmitted

checksum value means that the transmitter generated no checksum (for

debugging or for higher level protocols that don't care).

User Interface 用户接口

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A user interface should allow the creation of new receive ports,

receive operations on the receive ports that return the data octets

and an indication of source port and source address,

and an operation that allows a datagram to be sent, specifying the

data, source and destination ports and addresses to be sent.

用户接口应允许：创建新的接收端口，在接收端口上的接收操作，这些操作返回数据8位位组以及对源端口和源地址的指示，以及允许发送数据报的操作，指定要发送的数据，源端口和目标端口以及地址。

[page 2] Postel

28 Aug 1980

RFC 768 User Datagram Protocol

IP Interface

IP Interface IP接口

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The UDP module must be able to determine the source and destination

internet addresses and the protocol field from the internet header. One

possible UDP/IP interface would return the whole internet datagram

including all of the internet header in response to a receive operation.

Such an interface would also allow the UDP to pass a full internet

datagram complete with header to the IP to send. The IP would verify

certain fields for consistency and compute the internet header checksum.

UDP模块必须能够从网络头，确定源地址、目标地址和协议字段。一个可能的UDP/IP接口将返回整个网络数据报，包括所有网络头，为了响应一个接收到的操作。这样的接口还将允许UDP将完整的Internet数据报（带有标头）传递给IP发送。

IP将验证特定字段的一致性，并计算Internet头的校验和。

Protocol Application 协议应用

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The major uses of this protocol is the Internet Name Server [3], and the

Trivial File Transfer [4].

该协议的主要用途是Internet域名服务器（DNS）和价值不高的文件传输（TFT）。

Protocol Number 协议编号

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This is protocol 17 (21 octal) when used in the Internet Protocol.

Other protocol numbers are listed in [5].

在Internet协议中使用时，这是协议17（八进制21）。

References

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[1] Postel, J., "Internet Protocol," RFC 760, USC/Information

Sciences Institute, January 1980

[2] Postel, J., "Transmission Control Protocol," RFC 761,

USC/Information Sciences Institute, January 1980.

[3] Postel, J., "Internet Name Server," USC/Information Sciences

Institute, IEN 116, August 1979.

[4] Sollins, K., "The TFTP Protocol," Massachusetts Institute of

Technology, IEN 133, January 1980.

[5] Postel, J., "Assigned Numbers," USC/Information Sciences

Institute, RFC 762, January 1980.

Postel [page 3]

UDP（UserDatagramProtocol）是一个简单的面向消息的传输层协议，尽管UDP提供标头和有效负载的完整性验证（通过校验和），但它不保证向上层协议提供消息传递，并且UDP层在发送后不会保留UDP 消息的状态。因此，UDP有时被称为不可靠的数据报协议。如果需要传输可靠性，则必须在用户应用程序中实现。

UDP使用具有最小协议机制的简单无连接通信模型。UDP提供数据完整性的校验和，以及用于在数据报的源和目标寻址不同函数的端口号。它没有握手对话，因此将用户的程序暴露在底层网络的任何不可靠的方面。如果在网络接口级别需要纠错功能，应用程序可以使用为此目的设计的传输控制协议（TCP）。

综上所述：

UDP是基于IP的简单协议，不可靠的协议。

UDP的优点：简单，轻量化。

UDP的缺点：没有流控制，没有应答确认机制，不能解决丢包、重发、错序问题。

这里需要注意一点，并不是所有使用UDP协议的应用层都是不可靠的，应用程序可以自己实现可靠的数据传输，通过增加确认和重传机制，所以使用UDP 协议最大的特点就是速度快。

伪首部的特点

1.长度为12B

2.伪首部不是UDP的真正首部，只在计算校验和时用到

3.伪首部既不向下传送也不向上递交，只是为了计算校验和







