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MIME TYPE definition for tunnels
<[draft-durand-ngtrans-tunnel-mime-type-03.txt](#)>

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Abstract

Tunnels are very common in the Internet. They are often used to deploy new technologies such as multicast or IPv6 when the underlying infrastructure is not ready to natively support those new protocols. Virtual Private Network are also often build using IP in IP tunnels.

This document describe a MIME type that provide configuration information for tunnels.

1. Introduction

Managing IP in IP tunnels can be a complex task and various

approaches have been developed to assist network administrators. In the context of IPv6 transition, the tunnel broker model [\[BROKER\]](#) has been developed for that very purpose and highlighted the need for a formal description of IPv6 in IPv4 tunnels. However, such a description can be made more generic and provide information about almost any kind of tunnels.

[2. Related work](#)

[\[RADTUN\]](#) describe tunnel attributes in RADIUS format.

[3. Tunnel management](#)

Tools and/or protocols to do the actual tunnel management are out of the scope of this document.

[4. MIME type definition](#)

In conformance with [\[MIME\]](#), the MIME object to describe tunnels is defined in the IETF tree as a subtype of the "Application" MIME type.

The proposed subtype is "tunnel".

The tunnel described by this object is a unidirectional tunnel from host SRC to host DST.

[4.1 Parameters](#)

Mandatory parameters: none

Optional parameters: none

[4.2 Mandatory MIME headers](#)

[4.2.1 Encapsulation type](#)

header name: encapsulation-type

header type: Integer

possible values:

Tunnel encapsulation types values are taken from [\[RADTUN\]](#).

- 1 Point-to-Point Tunneling Protocol [\[PPTP\]](#)
- 2 Layer Two Forwarding [\[L2F\]](#)

- 3 Layer Two Tunneling Protocol [[L2TP](#)]
- 4 Ascend Tunnel Management Protocol [[ATMP](#)]
- 5 Virtual Tunneling Protocol (VTP)
- 6 IP Authentication Header in the Tunnel-mode (AH) [[IPsec](#)]
- 7 IP-in-IP Encapsulation [[IP-IP](#)]
- 8 Minimal IP-in-IP Encapsulation [MIN-IP]
- 9 IP Encapsulating Security Payload in the Tunnel-mode [[ESP](#)]
- 10 Generic Route Encapsulation [[GRE](#)]
- 11 Bay Dial Virtual Services (DVS)
- 12 IP-in-IP Tunneling [IPinIP]

[4.2.2](#) Tunnel inner medium type

header name: inner-medium
header type: Integer
possible values:

Tunnel inner medium type values are taken from [[NUMBER](#)].
A short excerpt is:

- 1 IPv4 (IP version 4)
- 2 IPv6 (IP version 6)
- 3 NSAP
- 4 HDLC (8-bit multidrop)
- 5 BBN 1822
- 6 802 (includes all 802 media plus Ethernet "canonical format")
- 7 E.163 (POTS)
- 8 E.164 (SMDS, Frame Relay, ATM)
- 9 F.69 (Telex)
- 10 X.121 (X.25, Frame Relay)
- 11 IPX
- 12 Appletalk
- 13 Decnet IV
- 14 Banyan Vines
- 15 E.164 with NSAP format subaddress

[4.2.3](#) Tunnel outer medium type

header name: outer-medium
header type: Integer
possible values:

Tunnel outer medium type values are taken from [[NUMBER](#)].
A short excerpt is:

- 1 IPv4 (IP version 4)
- 2 IPv6 (IP version 6)
- 3 NSAP
- 4 HDLC (8-bit multidrop)
- 5 BBN 1822
- 6 802 (includes all 802 media plus Ethernet "canonical format")
- 7 E.163 (POTS)
- 8 E.164 (SMDS, Frame Relay, ATM)
- 9 F.69 (Telex)
- 10 X.121 (X.25, Frame Relay)
- 11 IPX
- 12 Appletalk
- 13 Decnet IV
- 14 Banyan Vines
- 15 E.164 with NSAP format subaddress

4.2.4 Inner source address

header name: inner-src
header type: string
possible values: any textual representation of an
address enclosed in square brackets.

Inner source address is the source address in the inner header of any packet originated from host SRC through the tunnel.

4.2.4 Outer source address

header name: outer-src
header type: string
possible values: any textual representation of an
address enclosed in square brackets.

Outer source address is the source address in the outer header of any packet originated from host SRC through the tunnel.

4.2.5 Inner destination address

header name: inner-dst
header type: string
possible values: any textual representation of an
address enclosed in square brackets.

Inner destination address is the destination address in the inner header of any packet originated from host SRC through the tunnel.

4.2.6 Outer destination address

header name: outer-dst
header type: string
possible values: any textual representation of an
 address enclosed in square brackets.

Outer destination address is the destination address in the outer header of any packet originated from host SRC through the tunnel.

4.3 Optional MIME headers

4.3.1 Inner addresses lifetime

header name: inner-lifetime
header type: Integer
possible values: the lifetime in second of the inner pair
 of addresses, source and destination.

A value of zero means infinite lifetime.

4.3.2 Outer addresses lifetime

header name: outer-lifetime
header type: Integer
possible values: the lifetime in second of the outer pair
 of addresses, source and destination.

A value of zero means infinite lifetime.

4.3.3 E-mail contact for SRC

header name: src-email
header type: string
possible values: any valid email address, according to [[MAIL](#)].

This is the administrative contact email address for host SRC.
The exact semantic of this parameter is beyond the scope of
this document.

4.3.4 E-mail contact for DST

header name: dst-email
header type: string
possible values: any valid email address, according to [[MAIL](#)].

This is the administrative contact email address for host DST.
The exact semantic of this parameter is beyond the scope of
this document.

5. Example

The following will describe an IPv6 in IPv4 tunnel between SRC host A and DST host B. The lifetime of the tunnel is 1 hour. Alain Durand is the contact for host A and Jim Paugh is the contact for host B.

Host A IPv4 address is 100.100.100.100
Host A IPv6 address is 3ffe:ffff:ffff:1:0:0:0:A
Host B IPv4 address is 200.200.200.200
Host B IPv6 address is 3ffe:ffff:ffff:2:0:0:0:B

The mime object is:

```
Mime-version: 1.0
Content-type: Application/tunnel
encapsulation-type: 7
inner-medium: 2
outer-medium: 1
inner-src: 3ffe:ffff:ffff:1:0:0:0:A
outer-src: 100.100.100.100
inner-dst: 3ffe:ffff:ffff:2:0:0:0:B
outer-dst: 200.200.200.200
inner-lifetime: 3600
src-email: Alain.Durand@sun.com
dst-email: Jim.Paugh@sun.com
```

6. IANA registration

To: ietf-types@iana.org
Subject: Registration of MIME media type application/tunnel

MIME media type name: application

MIME subtype name: tunnel

Required parameters: none

Optional parameters: none

Encoding considerations: None

Required headers: encapsulation-type,
inner-medium, outer-medium,
inner-src, outer-src,
inner-dst, outer-dst

Optional headers: inner-lifetime, outer-lifetime,
src-email, dst-email

Security considerations:

The information contained in this MIME type may be used by application to configured tunnel. Inaccurate information can introduce all kind of security hazards, thus it is of the utmost importance that these information are transferred over a secure channel, that their originator is authenticated and that they are guaranteed not to be corrupted.

Interoperability considerations:

The mandatory parameters are necessary to guarantee interoperability.

Published specification: none

Applications which use this media type:
Tunnel Brokers, tunnel servers,
tunnel clients, any database storing tunnel information.

Additional information:

Magic number(s): none
File extension(s): none
Macintosh File Type Code(s): none

Person & email address to contact for further information:

Alain Durand	Jim Paugh
Alain.Durand@sun.com	Jim.Paugh@sun.com

Intended usage: COMMON

7. Security Considerations

The information contained in this MIME type may be used by application to configured tunnel. Inaccurate information can introduce all kind of security hazards, thus it is of the utmost importance that these information are transferred over a secure channel, that their originator is authenticated and that they are guaranteed not to be corrupted. The exact procedure/protocols to be used for this purpose is out of the scope of this document.

8. References

- [BROKER] Durand, A., Fasano, P., Guardini, I., Lento, D.,
IPv6 Tunnel Broker,
[RFC3052](#), February 2001

- [MIME] Freed, N., Borenstein, N.,
"Multipurpose Internet Mail Extensions
(MIME) Part four: MIME registration procedure, [RFC2048](#),
November 1996.

- [RADTUN] Zorn, G., Leifer, D., Rubens, A., Shriver, J., Holdrege, M.,
Goyret, I., RADIUS Attributes for Tunnel Protocol Support,
[RFC2868](#), June 2000.

- [MAIL] Crocker, D.,
Standard for the format of ARPA Internet text messages,
[RFC822](#), August 1982.

- [NUMBER] Reynolds, J. and J. Postel,
"Assigned Numbers", STD 2, [RFC 1700](#),
October 1994.

- [PPTP] Hamzeh, K., Pall, G., Verthein, W., Taarud,
J., Little, W. and G. Zorn,
"Point-to-Point Tunneling Protocol (PPTP)",
[RFC 2637](#), July 1999.

- [L2F] Valencia, A., Littlewood, M. and T. Kolar, T.,
"Cisco Layer Two Forwarding (Protocol) 'L2F'",
[RFC2341](#), May 1998.
- [L2TP] Townsley, W., Valencia, A., Rubens, A., Pall,
G., Zorn, G. and B. Palter,
"Layer Two Tunneling Protocol (L2TP)",
[RFC2661](#), August 1999.
- [ATMP] Hamzeh, K., "Ascend Tunnel Management Protocol - ATMP",
[RFC2107](#), February 1997.
- [IPsec] Kent, S. and R. Atkinson,
"Security Architecture for the Internet Protocol",
[RFC2401](#), November 1998.
- [IP-IP] Perkins, C., "IP Encapsulation within IP",
[RFC2003](#), October 1996.
- [Min-IP] Perkins, C., "Minimal Encapsulation within IP",
[RFC2004](#), October 1996.
- [ESP] Atkinson, R., "IP Encapsulating Security Payload (ESP)",
[RFC1827](#), August 1995.
- [GRE] Hanks, S., Li, T., Farinacci, D. and P. Traina,
"Generic Routing Encapsulation (GRE)",
[RFC 1701](#), October 1994.
- [INinIP] Simpson, W., "IP in IP Tunneling",
[RFC1853](#), October 1995.

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