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[TOC](#)

Test vectors for STUN

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Abstract

The Session Traversal Utilities for NAT (STUN) protocol defines two STUN attributes -- FINGERPRINT and MESSAGE-INTEGRITY -- that may be included in STUN messages. This document provides test vectors for those two attributes.

Table of Contents

- [1.](#) Introduction
- [2.](#) Test vectors
 - [2.1.](#) Sample request
 - [2.2.](#) Sample IPv4 response
 - [2.3.](#) Sample IPv6 response

- [3. Security Considerations](#)
- [4. IANA Considerations](#)
- [5. Acknowledgements](#)
- [6. Normative References](#)
- [Appendix A. Source code for test vectors](#)

1. Introduction

[TOC](#)

The Session Traversal Utilities for NAT (STUN)

[\[I-D.ietf-behave-rfc3489bis\]](#) (Rosenberg, J., Mahy, R., Matthews, P., and D. Wing, "Session Traversal Utilities for (NAT) (STUN)," July 2008.) protocol defines two different hashes that may be included in messages exchanged by peers implementing that protocol:

FINGERPRINT attribute: a 32-bits Circular Redundancy Check.

MESSAGE-INTEGRITY attribute: a HMAC-SHA1 authentication code.

This document provides samples of properly-formatted STUN messages including these hashes, for the sake of testing implementations of the STUN protocol.

2. Test vectors

[TOC](#)

All included vectors are represented as a series of hexadecimal values in network byte order. Each pair of hexadecimal digits represents one byte.

Messages follow the ICE Connectivity Checks use case of STUN, (see [\[I-D.ietf-mmusic-ice\]](#) (Rosenberg, J., "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols," October 2007.)). These messages include FINGERPRINT, MESSAGE-INTEGRITY and XOR-MAPPED-ADDRESS STUN attributes. These attributes are considered to be most prone to implementation errors.

In the following sample messages, two types of plain UTF-8 text attributes are included. The value of these attributes were purposely sized to require padding. In this document, ASCII white spaces (U+0020) are used for padding - this is arbitrary. As per [\[I-D.ietf-behave-rfc3489bis\]](#) (Rosenberg, J., Mahy, R., Matthews, P., and D. Wing, "Session Traversal Utilities for (NAT) (STUN)," July 2008.), padding bytes can have any value.

2.1. Sample request

[TOC](#)

This request uses the following parameters:

Username: "evtj:h6vY" (without quotes)
Password: "V0kJxbRl1RmTxUk/WvJxBt" (without quotes)

00 01 00 44	Request type and message length
21 12 a4 42	Magic cookie
b7 e7 a7 01 }	
bc 34 d6 86 }	Transaction ID
fa 87 df ae }	
00 24 00 04	PRIORITY attribute header
6e 00 01 ff	ICE priority value
80 29 00 08	ICE-CONTROLLED attribute header
93 2f f9 b1 }	Pseudo-random tie breaker...
51 26 3b 36 }	...for ICE control
00 06 00 09	USERNAME attribute header
65 76 74 6a }	
3a 68 36 76 }	Username (9 bytes) and padding (3 bytes)
59 20 20 20 }	
00 08 00 14	MESSAGE-INTEGRITY attribute header
62 4e eb dc }	
3c c9 2d d8 }	
4b 74 bf 85 }	HMAC-SHA1 fingerprint
d1 c0 f5 de }	
36 87 bd 33 }	
80 28 00 04	FINGERPRINT attribute header
ad 8a 85 ff	CRC32 fingerprint

2.2. Sample IPv4 response

[TOC](#)

This response used the following parameter:

Password: "V0kJxbRl1RmTxUk/WvJxBt" (without quotes)
Server name: "test vector" (without quotes)
Mapped address: 192.0.2.1 port 32853

01 01 00 3c	Response type and message length
21 12 a4 42	Magic cookie
b7 e7 a7 01 }	
bc 34 d6 86 }	Transaction ID
fa 87 df ae }	
80 22 00 0b	SERVER attribute header
74 65 73 74 }	
20 76 65 63 }	UTF-8 server name
74 6f 72 20 }	
00 20 00 08	XOR-MAPPED-ADDRESS attribute header
00 01 a1 47	Address family (IPv4) and xor'd mapped port number
e1 12 a6 43	Xor'd mapped IPv4 address
00 08 00 14	MESSAGE-INTEGRITY attribute header
2b 91 f5 99 }	
fd 9e 90 c3 }	
8c 74 89 f9 }	HMAC-SHA1 fingerprint
2a f9 ba 53 }	
f0 6b e7 d7 }	
80 28 00 04	FINGERPRINT attribute header
c0 7d 4c 96	CRC32 fingerprint

2.3. Sample IPv6 response

[TOC](#)

This response used the following parameter:

Password: "V0kJxbRl1RmTxUk/WvJxBt" (without quotes)

Server name: "test vector" (without quotes)

Mapped address: 2001:db8:1234:5678:11:2233:4455:6677 port 32853

01 01 00 48	Response type and message length
21 12 a4 42	Magic cookie
b7 e7 a7 01 }	
bc 34 d6 86 }	Transaction ID
fa 87 df ae }	
80 22 00 0b	SERVER attribute header
74 65 73 74 }	
20 76 65 63 }	UTF-8 server name
74 6f 72 20 }	
00 20 00 14	XOR-MAPPED-ADDRESS attribute header
00 02 a1 47	Address family (IPv6) and xor'd mapped port number
01 13 a9 fa }	
a5 d3 f1 79 }	Xor'd mapped IPv6 address
bc 25 f4 b5 }	
be d2 b9 d9 }	
00 08 00 14	MESSAGE-INTEGRITY attribute header
a3 82 95 4e }	
4b e6 7b f1 }	
17 84 c9 7c }	HMAC-SHA1 fingerprint
82 92 c2 75 }	
bf e3 ed 41 }	
80 28 00 04	FINGERPRINT attribute header
c8 fb 0b 4c	CRC32 fingerprint

3. Security Considerations

[TOC](#)

There are no security considerations.

4. IANA Considerations

[TOC](#)

This document raises no IANA considerations.

5. Acknowledgements

[TOC](#)

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6. Normative References

[TOC](#)

[I-D.ietf-behave-rfc3489bis]	Rosenberg, J., Mahy, R., Matthews, P., and D. Wing, " Session Traversal Utilities for (NAT) (STUN) ," draft-ietf-behave-rfc3489bis-18 (work in progress), July 2008 (TXT).
[I-D.ietf-mmusic-ice]	Rosenberg, J., " Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols ," draft-ietf-mmusic-ice-19 (work in progress), October 2007 (TXT).

Appendix A. Source code for test vectors

[TOC](#)

```
const unsigned char req[] =
    "\x00\x01\x00\x44"
    "\x21\x12\xa4\x42"
    "\xb7\xe7\xa7\x01\xbc\x34\xd6\x86\xfa\x87\xdf\xae"
    "\x00\x24\x00\x04"
    "\x6e\x00\x01\xff"
    "\x80\x29\x00\x08"
    "\x93\x2f\xf9\xb1\x51\x26\x3b\x36"
    "\x00\x06\x00\x09"
    "\x65\x76\x74\x6a\x3a\x68\x36\x76\x59\x20\x20\x20"
    "\x00\x08\x00\x14"
    "\x62\x4e\xeb\xdc\x3c\xc9\x2d\xd8\x4b\x74\xbf\x85"
    "\xd1\xc0\xf5\xde\x36\x87\xbd\x33"
    "\x80\x28\x00\x04"
    "\xad\x8a\x85\xff";
```

Request message

```
const unsigned char respv4[] =
    "\x01\x01\x00\x3c"
    "\x21\x12\xa4\x42"
    "\xb7\xe7\xa7\x01\xbc\x34\xd6\x86\xfa\x87\xdf\xae"
    "\x80\x22\x00\x0b"
    "\x74\x65\x73\x74\x20\x76\x65\x63\x74\x6f\x72\x20"
    "\x00\x20\x00\x08"
    "\x00\x01\xa1\x47\xe1\x12\xa6\x43"
    "\x00\x08\x00\x14"
    "\x2b\x91\xf5\x99\xfd\x9e\x90\xc3\x8c\x74\x89\xf9"
    "\x2a\xf9\xba\x53\xf0\x6b\xe7\xd7"
    "\x80\x28\x00\x04"
    "\xc0\x7d\x4c\x96";
```

IPv4 response message

```
const unsigned char respv6[] =
    "\x01\x01\x00\x48"
    "\x21\x12\xa4\x42"
    "\xb7\xe7\xa7\x01\xbc\x34\xd6\x86\xfa\x87\xdf\xae"
    "\x80\x22\x00\x0b"
    "\x74\x65\x73\x74\x20\x76\x65\x63\x74\x6f\x72\x20"
    "\x00\x20\x00\x14"
    "\x00\x02\xa1\x47"
    "\x01\x13\xa9\xfa\xa5\xd3\xf1\x79"
    "\xbc\x25\xf4\xb5\xbe\xd2\xb9\xd9"
    "\x00\x08\x00\x14"
    "\xa3\x82\x95\x4e\x4b\xe6\x7b\xf1\x17\x84\xc9\x7c"
    "\x82\x92\xc2\x75\xbf\xe3\xed\x41"
    "\x80\x28\x00\x04"
    "\xc8\xfb\x0b\x4c";
```

IPv6 response message

Author's Address

[TOC](#)

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[TOC](#)

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