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The Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Static Dictionary for Signaling Compression (SigComp)

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

The Session Initiation Protocol (SIP) is a text-based protocol for initiating and managing communication sessions. The protocol can be compressed by using Signaling Compression (SigComp). Similarly, the Session Description Protocol (SDP) is a text-based protocol intended for describing multimedia sessions for the purposes of session announcement, session invitation, and other forms of multimedia session initiation. This memo defines the SIP/SDP-specific static dictionary that SigComp may use in order to achieve higher efficiency. The dictionary is compression algorithm independent.

Table of Contents

1. Introduction.....	2
2. Design considerations.....	3
3. Binary representation of the SIP/SDP dictionary.....	5
4. Security Considerations.....	13
5. IANA Considerations.....	13
6. Acknowledgements.....	14
7. References.....	14
7.1 Normative References.....	14
7.2 Informative References.....	14
Appendix A. SIP input strings to the SIP/SDP static dictionary.....	17
Appendix B. SDP input strings to the SIP/SDP static dictionary.....	26
Authors' Addresses.....	29
Full Copyright Statement.....	30

1. Introduction

SIP [3] and SDP [24] are text-based protocols that use the UTF-8 charset (RFC 2279 [5]). SIP and SDP were designed for rich bandwidth links. However, when SIP/SDP is run over narrow bandwidth links, such as radio interfaces or low speed serial links, the session setup time increases substantially, compared to an operation over a rich bandwidth link.

The session setup time can decrease dramatically if the SIP/SDP signaling is compressed. The signaling compression mechanisms specified in SigComp [1] provide a multiple compression/decompression algorithm framework to compress and decompress text-based protocols such as SIP and SDP.

When compression is used in SIP/SDP, the compression achieves its maximum rate once a few message exchanges have taken place. This is due to the fact that the first message the compressor sends to the decompressor is only partially compressed, as there is not a previous stored state to compress against. As the goal is to reduce the session setup time as much as possible, it seems sensible to investigate a mechanism to boost the compression rate from the first message.

In this memo we introduce the static dictionary for SIP and SDP. The dictionary is to be used in conjunction with SIP, SDP and SigComp. The static SIP/SDP dictionary constitutes a SigComp state that can be referenced in the first SIP message that the compressor sends out.

2. Design considerations

The static SIP/SDP dictionary is a collection of well-known strings that appear in most of the SIP and SDP messages. The dictionary is not a comprehensive list of reserved words, but it includes many of the strings that appear in SIP and SDP signaling.

The static dictionary is unique and **MUST** be available in all SigComp implementations for SIP/SDP. The dictionary is not intended to evolve as SIP or SDP evolve. It is defined once, and stays as is forever. This solves the problems of updating, upgrading and finding out the dictionary that is supported at the remote end when several versions of the same dictionary coexist.

Appendix A contains the collection of strings that SIP contributed to the static dictionary. The appendix includes references to the documents that define those strings.

Appendix B contains the collection of strings that SDP contributed to the static dictionary. Again, the appendix includes references to the documents that define those strings.

While these appendices are of an informative nature, Section 3 gives the normative binary form of the SIP/SDP dictionary. This is the dictionary that is included in the SigComp implementation. This dictionary has been formed from the collection of individual dictionaries given in appendices A and B.

The two input collections are collections of UTF-8 encoded character strings. In order to facilitate the readability, the appendices describe them in one table for each collection. In these tables, each row represents an entry. Each entry contains the string that actually occurs in the dictionary, its priority (see below), its offset from the first octet and its length (both in hexadecimal), and one or more references that elucidate why this string is expected to occur in SIP/SDP messages. Note: Length in this document always refers to octets.

The columns in the tables are described as follows:

String: represents the UTF-8 string that is inserted into the dictionary. Note that the quotes (") are not part of the string itself. Note also that the notation [CRLF] represents a Carriage Return character (ASCII code 0x0D) followed by a Line Feed character (ASCII code 0x0A).

Pr: indicates the priority of this string within the dictionary. Some compression algorithms, such as DEFLATE, offer an increased efficiency when the most commonly used strings are located at the bottom of the dictionary. To facilitate generating a dictionary that has the most frequently occurring strings further down at the bottom, we have decided to allocate a priority to each string in the dictionary. Priorities range from 1 until 5. A low number in the priority column (e.g., 1) indicates that we believe in a high probability of finding the string in SIP or SDP messages. A high number in the priority column (e.g., 5) indicates lower probability of finding the string in a SIP or SDP message. This is typically the case for less frequent error codes or optional infrequent tags.

Off: indicates the hexadecimal offset of the entry with respect to the first octet in the dictionary. Note that several strings in the collections can share space in the dictionary if they exhibit suitable common substrings.

Len: the length of the string (in octets, in hexadecimal).

References: contains one or more references to the specification and the section within the specification where the string is defined.

Note that the strings stored in the dictionary are case sensitive. (Again, the strings do not comprise the quotes ("), they are just shown here to increase the readability.) Where the string is a header field, we also included the colon ":" and the amount of white space expected to occur. Note that this means that not all messages that conform to the SIP Augmented BNF, which allows other combinations (e.g., a white space or horizontal tabulator before the colon (":") sign), will benefit as much from the dictionary -- the best increase in compression performance is to be expected for messages that use the recommended formatting guidelines for SIP.

Some strings appear followed by an equal sign and some others do not. This depends on whether the string is part of a parameter name or a parameter value.

In a SIP message, all the SIP headers terminate with a CRLF pair of characters. As these characters are appended to the end of each SIP header line, right after the header values, and because the header values are typically not part of the static SIP dictionary, we cannot include the terminating CRLF as part of the SIP static dictionary. Instead, the approach we have taken is to include in each header field entry the CRLF from the previous line that prefixes every header field. We have represented CRLF by the notation [CRLF]. Therefore, in generating the actual binary dictionary, an entry in the dictionary represented as: "[CRLF]From: " has been interpreted as

an entry whose value is CR, LF, the word From, a colon and a whitespace.

Note that most SIP header field names are included with the full string from CRLF to the colon-blank pair. However, in certain situations, when the likelihood of occurrence is not considered high (as indicated by a priority value of 3 to 5), and when there are common substrings shared by a number of headers, we have added one entry with the common substring and several entries with the non-common substrings remaining. An example is the "Proxy-Authenticate" and "Proxy-Authorization" headers. There are three entries in the dictionary: the common substring "[CRLF]Proxy-", and the non-common substrings "Authenticate: " and "Authorization: ". This allows the re-use of the non-common substrings by other entries and may save a number of bytes in the binary form of the dictionary. Note that this splitting mechanism does not apply with strings that are likely to occur very often (those whose priority is set to 1 or 2).

SIP responses start with a status code (e.g., "302") and a reason phrase (e.g., "Moved Temporarily"). The status code is a normative part, whereas the reason phrase is not normative, it is just a suggested text. For instance, both "302 Moved Temporarily" and "302 Redirect" are valid beginnings of SIP responses.

In the SIP dictionary we have included two entries per response code, one including only the status code and a space (e.g., "302 ") and another one including both the status code and the suggested reason phrase (e.g., "302 Moved Temporarily"). The former can be used when the SIP response changed the suggested reason phrase to another one. The latter can be used when the suggested reason phrase is part of the response. In this way, we accommodate both alternatives. (Note that in the actual dictionary, both strings occupy the same space in the string subset, but have two separate entries in the table subset.)

3. Binary representation of the SIP/SDP dictionary

This section contains the result of combining the SIP and the SDP dictionaries described in appendices A and B in order to create a single dictionary that is loaded into SigComp as a state.

The binary SigComp dictionary is comprised of two parts, the concatenation of which serves as the state value of the state item: A string subset, which contains all strings in the contributing collections as a substring (roughly ordered such that strings with low priority numbers occur at the end), and a table subset, which contains pairs of length and offset values for all the strings in the contributing collections. In each of these pairs, the length is

stored as a one-byte value, and the offset is stored as a two-byte value that has had 1024 added to the offset (this allows direct referencing from the stored value if the dictionary state has been loaded at address 1024).

The intention is that all compression algorithms will be able to use the (or part of the) string subset, and some compression methods, notably those that are related to the LZ78 family, will also use the table in order to form an initial set of tokens for that compression method. The text below therefore gives examples for referencing both the table subset and the string subset of the dictionary state item.

As defined in section 3.3.3 in the Signaling Compression specification [1], a SigComp state is characterized by a certain set of information. For the static SIP/SDP dictionary, the information in the following Table 1 fully characterizes the state item.

Note that the string subset of the dictionary can be accessed using:

STATE-ACCESS (%ps, 6, 0, 0x0D8C, %sa, 0),

and the table subset can be accessed using:

STATE-ACCESS (%ps, 6, 0x0D8C, 0x0558, %sa, 0),

where %ps points to UDVM memory containing

0xfbe507dfe5e6

and %sa is the desired destination address in UDVM memory (with UDVM byte copying rules applied).

If only a subset of the dictionary up to a specific priority is desired (e.g., to save UDVM space), the values for the third and fourth operand in these STATE-ACCESS instructions can be changed to:

Priorities desired	String offset	String length	Table offset	Table length
=====	=====	=====	=====	=====
1 only	0x0CB2	0x00DA	0x0D8C	0x003F
1..2	0x0920	0x046C	0x0D8C	0x0147
1..3	0x07B8	0x05D4	0x0D8C	0x01A7
1..4	0x0085	0x0D07	0x0D8C	0x044A
1..5	0x0000	0x0D8C	0x0D8C	0x0558

The state item consists of the following elements:

Name:	Value:
=====	=====
state_identifier	0xfbe507dfe5e6aa5af2abb914ceaa05f99ce61ba5
state_length	0x12E4
state_address	0 (not relevant for the dictionary)
state_instruction	0 (not relevant for the dictionary)
minimum_access_length	6
state_value	Representation of the table below.

0000	0d0a	5265	6a65	6374	2d43	6f6e	7461	6374	..Reject-Contact
0010	3a20	0d0a	4572	726f	722d	496e	666f	3a20	: ..Error-Info:
0020	0d0a	5469	6d65	7374	616d	703a	200d	0a43	..Timestamp: ..C
0030	616c	6c2d	496e	666f	3a20	0d0a	5265	706c	all-Info: ..Repl
0040	792d	546f	3a20	0d0a	5761	726e	696e	673a	y-To: ..Warning:
0050	200d	0a53	7562	6a65	6374	3a20	3b68	616e	..Subject: ;han
0060	646c	696e	673d	696d	6167	653b	7075	7270	dling=image;purp
0070	6f73	653d	3b63	6175	7365	3d3b	7465	7874	ose=;cause=;text
0080	3d63	6172	6433	3030	204d	756c	7469	706c	=card300 Multipl
0090	6520	4368	6f69	6365	736d	696d	6573	7361	e Choicesmimessa
00A0	6765	2f73	6970	6672	6167	3430	3720	5072	ge/sipfrag407 Pr
00B0	6f78	7920	4175	7468	656e	7469	6361	7469	oxy Authenticati
00C0	6f6e	2052	6571	7569	7265	6469	6765	7374	on Requiredigest
00D0	2d69	6e74	6567	7269	7479	3438	3420	4164	-integrity484 Ad
00E0	6472	6573	7320	496e	636f	6d70	6c65	7465	dress Incomplete
00F0	6c65	7068	6f6e	652d	6576	656e	7473	3439	lephone-events49
0100	3420	5365	6375	7269	7479	2041	6772	6565	4 Security Agree
0110	6d65	6e74	2052	6571	7569	7265	6465	6163	ment Requiredeac
0120	7469	7661	7465	6434	3831	2043	616c	6c2f	tivated481 Call/
0130	5472	616e	7361	6374	696f	6e20	446f	6573	Transaction Does
0140	204e	6f74	2045	7869	7374	616c	653d	3530	Not Existale=50
0150	3020	5365	7276	6572	2049	6e74	6572	6e61	0 Server Interna
0160	6c20	4572	726f	726f	6275	7374	2d73	6f72	l Errorobust-sor
0170	7469	6e67	3d34	3136	2055	6e73	7570	706f	ting=416 Unsuppo
0180	7274	6564	2055	5249	2053	6368	656d	6572	rted URI Schemer
0190	6765	6e63	7934	3135	2055	6e73	7570	706f	gency415 Unsuppo
01A0	7274	6564	204d	6564	6961	2054	7970	656e	rted Media Typen
01B0	6469	6e67	3438	3820	4e6f	7420	4163	6365	ding488 Not Acce
01C0	7074	6162	6c65	2048	6572	656a	6563	7465	ptable Herejecte
01D0	6434	3233	2049	6e74	6572	7661	6c20	546f	d423 Interval To
01E0	6f20	4272	6965	6672	6f6d	2d74	6167	512e	o Briefrom-tagQ.
01F0	3835	3035	2056	6572	7369	6f6e	204e	6f74	8505 Version Not
0200	2053	7570	706f	7274	6564	3430	3320	466f	Supported403 Fo
0210	7262	6964	6465	6e6f	6e2d	7572	6765	6e74	rbiddenon-urgent
0220	3432	3920	5072	6f76	6964	6520	5265	6665	429 Provide Refe
0230	7272	6f72	2049	6465	6e74	6974	7934	3230	rror Identity420
0240	2042	6164	2045	7874	656e	7369	6f6e	6f72	Bad Extensionor

0250	6573	6f75	7263	650d	0a61	3d6b	6579	2d6d	esource..a=key-m
0260	676d	743a	6d69	6b65	794f	5054	494f	4e53	gmt:mikeyOPTIONS
0270	204c	616e	6775	6167	653a	2035	3034	2053	Language: 504 S
0280	6572	7665	7220	5469	6d65	2d6f	7574	6f2d	erver Time-outo-
0290	7461	670d	0a41	7574	6865	6e74	6963	6174	tag..Authenticat
02A0	696f	6e2d	496e	666f	3a20	4465	6320	3338	ion-Info: Dec 38
02B0	3020	416c	7465	726e	6174	6976	6520	5365	0 Alternative Se
02C0	7276	6963	6535	3033	2053	6572	7669	6365	rvice503 Service
02D0	2055	6e61	7661	696c	6162	6c65	3432	3120	Unavailable421
02E0	4578	7465	6e73	696f	6e20	5265	7175	6972	Extension Requir
02F0	6564	3430	3520	4d65	7468	6f64	204e	6f74	ed405 Method Not
0300	2041	6c6c	6f77	6564	3438	3720	5265	7175	Allowed487 Requ
0310	6573	7420	5465	726d	696e	6174	6564	6175	est Terminatedau
0320	7468	2d69	6e74	6572	6c65	6176	696e	673d	th-interleaving=
0330	0d0a	6d3d	6170	706c	6963	6174	696f	6e20	..m=application
0340	4175	6720	3531	3320	4d65	7373	6167	6520	Aug 513 Message
0350	546f	6f20	4c61	7267	6536	3837	2044	6961	Too Large687 Dia
0360	6c6f	6720	5465	726d	696e	6174	6564	3330	log Terminated30
0370	3220	4d6f	7665	6420	5465	6d70	6f72	6172	2 Moved Temporar
0380	696c	7933	3031	204d	6f76	6564	2050	6572	ily301 Moved Per
0390	6d61	6e65	6e74	6c79	6d75	6c74	6970	6172	manentlymultipar
03A0	742f	7369	676e	6564	0d0a	5265	7472	792d	t/signed..Retry-
03B0	4166	7465	723a	2047	4d54	6875	2c20	3430	After: GMThu, 40
03C0	3220	5061	796d	656e	7420	5265	7175	6972	2 Payment Requir
03D0	6564	0d0a	613d	6f72	6965	6e74	3a6c	616e	ed..a=orient:lan
03E0	6473	6361	7065	3430	3020	4261	6420	5265	dscape400 Bad Re
03F0	7175	6573	7472	7565	3439	3120	5265	7175	questtrue491 Requ
0400	6573	7420	5065	6e64	696e	6735	3031	204e	est Pending501 N
0410	6f74	2049	6d70	6c65	6d65	6e74	6564	3430	ot Implemented40
0420	3620	4e6f	7420	4163	6365	7074	6162	6c65	6 Not Acceptable
0430	3630	3620	4e6f	7420	4163	6365	7074	6162	606 Not Acceptab
0440	6c65	0d0a	613d	7479	7065	3a62	726f	6164	le..a=type:broad
0450	6361	7374	6f6e	6534	3933	2055	6e64	6563	castone493 Undec
0460	6970	6865	7261	626c	650d	0a4d	494d	452d	ipherable..MIME-
0470	5665	7273	696f	6e3a	204d	6179	2034	3832	Version: May 482
0480	204c	6f6f	7020	4465	7465	6374	6564	0d0a	Loop Detected..
0490	4f72	6761	6e69	7a61	7469	6f6e	3a20	4a75	Organization: Ju
04A0	6e20	6d6f	6465	2d63	6861	6e67	652d	6e65	n mode-change-ne
04B0	6967	6862	6f72	3d63	7269	7469	6361	6c65	ighbor=criticale
04C0	7274	6370	2d66	6234	3839	2042	6164	2045	rtcp-fb489 Bad E
04D0	7665	6e74	6c73	0d0a	556e	7375	7070	6f72	ventls..Unsuppor
04E0	7465	643a	204a	616e	2035	3032	2042	6164	ted: Jan 502 Bad
04F0	2047	6174	6577	6179	6d6f	6465	2d63	6861	Gatewaymode-cha
0500	6e67	652d	7065	7269	6f64	3d0d	0a61	3d6f	nge-period=..a=o
0510	7269	656e	743a	7365	6173	6361	7065	0d0a	rient:seascape..
0520	613d	7479	7065	3a6d	6f64	6572	6174	6564	a=type:moderated
0530	3430	3420	4e6f	7420	466f	756e	6433	3035	404 Not Found305
0540	2055	7365	2050	726f	7879	0d0a	613d	7479	Use Proxy..a=ty

0550	7065	3a72	6563	766f	6e6c	790d	0a61	3d74	pe:recvonly..a=t
0560	7970	653a	6d65	6574	696e	670d	0a6b	3d70	ype:meeting..k=p
0570	726f	6d70	743a	0d0a	5265	6665	7272	6564	rompt:..Referred
0580	2d42	793a	200d	0a49	6e2d	5265	706c	792d	-By: ..In-Reply-
0590	546f	3a20	5452	5545	6e63	6f64	696e	673a	To: TRUEncoding:
05A0	2031	3832	2051	7565	7565	6441	7574	6865	182 QueuedAuthe
05B0	6e74	6963	6174	653a	200d	0a55	7365	722d	nticate: ..User-
05C0	4167	656e	743a	200d	0a61	3d66	7261	6d65	Agent: ..a=frame
05D0	7261	7465	3a0d	0a41	6c65	7274	2d49	6e66	rate:..Alert-Inf
05E0	6f3a	2043	414e	4345	4c20	0d0a	613d	6d61	o: CANCEL ..a=ma
05F0	7870	7469	6d65	3a3b	7265	7472	792d	6166	xptime;;retry-af
0600	7465	723d	7561	6368	616e	6e65	6c73	3d34	ter=uachannels=4
0610	3130	2047	6f6e	650d	0a52	6566	6572	2d54	10 Gone..Refer-T
0620	6f3a	200d	0a50	7269	6f72	6974	793a	200d	o: ..Priority: .
0630	0a6d	3d63	6f6e	7472	6f6c	200d	0a61	3d71	.m=control ..a=q
0640	7561	6c69	7479	3a0d	0a61	3d73	6470	6c61	uality:..a=sdpla
0650	6e67	3a0d	0a61	3d63	6861	7273	6574	3a0d	ng:..a=charset:..
0660	0a52	6570	6c61	6365	733a	2052	4546	4552	.Replaces: REFER
0670	2069	7073	6563	2d69	6b65	3b74	7261	6e73	ipsec-ike;trans
0680	706f	7274	3d0d	0a61	3d6b	6579	7764	733a	port=..a=keywds:
0690	0d0a	6b3d	6261	7365	3634	3a3b	7265	6672	..k=base64;;refr
06A0	6573	6865	723d	0d0a	613d	7074	696d	653a	esher=..a=ptime:
06B0	0d0a	6b3d	636c	6561	723a	3b72	6563	6569	..k=clear;;recei
06C0	7665	643d	3b64	7572	6174	696f	6e3d	0d0a	ved=;duration=..
06D0	4163	6365	7074	3a20	0d0a	613d	6772	6f75	Accept: ..a=grou
06E0	703a	4641	4c53	453a	2049	4e46	4f20	0d0a	p:FALSE: INFO ..
06F0	4163	6365	7074	2d0d	0a61	3d6c	616e	673a	Accept-..a=lang:
0700	0d0a	6d3d	6461	7461	206d	6f64	652d	7365	..m=data mode-se
0710	743d	0d0a	613d	746f	6f6c	3a54	4c53	756e	t=..a=tool:TLSun
0720	2c20	0d0a	4461	7465	3a20	0d0a	613d	6361	, ..Date: ..a=ca
0730	743a	0d0a	6b3d	7572	693a	0d0a	5072	6f78	t:..k=uri:..Prox
0740	792d	3b72	6561	736f	6e3d	3b6d	6574	686f	y-;reason=;metho
0750	643d	0d0a	613d	6d69	643a	3b6d	6164	6472	d=..a=mid;;maddr
0760	3d6f	7061	7175	653d	0d0a	4d69	6e2d	3b61	=opaque=..Min-;a
0770	6c67	3d4d	6f6e	2c20	5475	652c	2057	6564	lg=Mon, Tue, Wed
0780	2c20	4672	692c	2053	6174	2c20	3b74	746c	, Fri, Sat, ;ttl
0790	3d61	7574	733d	0d0a	723d	0d0a	7a3d	0d0a	=auts=..r=..z=..
07A0	653d	3b69	643d	0d0a	693d	6372	633d	0d0a	e;;id=..i=crc=..
07B0	753d	3b71	3d75	6173	3431	3420	5265	7175	u;;q=uas414 Requ
07C0	6573	742d	5552	4920	546f	6f20	4c6f	6e67	est-URI Too Long
07D0	6976	6575	7072	6976	6163	7975	6470	7265	iveuprivacyudpre
07E0	6665	7236	3030	2042	7573	7920	4576	6572	fer600 Busy Ever
07F0	7977	6865	7265	7175	6972	6564	3438	3020	ywherequired480
0800	5465	6d70	6f72	6172	696c	7920	556e	6176	Temporarily Unav
0810	6169	6c61	626c	650d	0a61	3d74	7970	653a	ailable..a=type:
0820	482e	3333	3230	3220	4163	6365	7074	6564	H.33202 Accepted
0830	0d0a	5365	7373	696f	6e2d	4578	7069	7265	..Session-Expire
0840	733a	200d	0a53	7562	7363	7269	7074	696f	s: ..Subscriptio

0850	6e2d	5374	6174	653a	204e	6f76	200d	0a53	n-State: Nov ..S
0860	6572	7669	6365	2d52	6f75	7465	3a20	5365	ervice-Route: Se
0870	7020	0d0a	416c	6c6f	772d	4576	656e	7473	p ..Allow-Events
0880	3a20	4665	6220	0d0a	613d	696e	6163	7469	: Feb ..a=inacti
0890	7665	5254	502f	5341	5650	2052	5450	2f41	veRTP/SAVP RTP/A
08A0	5650	4620	416e	6f6e	796d	6f75	7369	7073	VPF Anonymousips
08B0	3a0d	0a61	3d74	7970	653a	7465	7374	656c	...a=type:testel
08C0	3a4d	4553	5341	4745	200d	0a61	3d72	6563	:MESSAGE ..a=rec
08D0	766f	6e6c	790d	0a61	3d73	656e	646f	6e6c	vonly..a=sendonl
08E0	790d	0a63	3d49	4e20	4950	3420	0d0a	5265	y..c=IN IP4 ..Re
08F0	6173	6f6e	3a20	0d0a	416c	6c6f	773a	200d	ason: ..Allow: .
0900	0a45	7665	6e74	3a20	0d0a	5061	7468	3a20	.Event: ..Path:
0910	3b75	7365	723d	0d0a	623d	4153	2043	5420	;user=..b=AS CT
0920	0d0a	5757	572d	4175	7468	656e	7469	6361	..WWW-Authentica
0930	7465	3a20	4469	6765	7374	200d	0a61	3d73	te: Digest ..a=s
0940	656e	6472	6563	7669	6465	6f63	7465	742d	endrecvideoctet-
0950	616c	6967	6e3d	6170	706c	6963	6174	696f	align=applicatio
0960	6e2f	7364	7061	7468	6561	6465	7273	7061	n/sdpatheaderspa
0970	7574	683d	0d0a	613d	6f72	6965	6e74	3a70	uth=..a=orient:p
0980	6f72	7472	6169	7469	6d65	6f75	7474	722d	ortraitimeouttr-
0990	696e	7469	636f	6e63	3d34	3833	2054	6f6f	inticonc=483 Too
09A0	204d	616e	7920	486f	7073	6c69	6e66	6f70	Many Hopslinfop
09B0	7469	6f6e	616c	676f	7269	7468	6d3d	3630	tionalgorithm=60
09C0	3420	446f	6573	204e	6f74	2045	7869	7374	4 Does Not Exist
09D0	2041	6e79	7768	6572	6573	706f	6e73	653d	Anywheresponse=
09E0	0d0a	0d0a	5265	7175	6573	742d	4469	7370	....Request-Disp
09F0	6f73	6974	696f	6e3a	204d	4435	3830	2050	osition: MD580 P
0A00	7265	636f	6e64	6974	696f	6e20	4661	696c	recondition Fail
0A10	7572	6570	6c61	6365	7334	3232	2053	6573	ureplaces422 Ses
0A20	7369	6f6e	2049	6e74	6572	7661	6c20	546f	sion Interval To
0A30	6f20	536d	616c	6c6f	6361	6c31	3831	2043	o Smallocal181 C
0A40	616c	6c20	4973	2042	6569	6e67	2046	6f72	all Is Being For
0A50	7761	7264	6564	6f6d	6169	6e3d	6661	696c	wardedomain=fail
0A60	7572	656e	6465	7265	616c	6d3d	5355	4253	urenderealm=SUBS
0A70	4352	4942	4520	7072	6563	6f6e	6469	7469	CRIBE preconditi
0A80	6f6e	6f72	6d61	6c69	7073	6563	2d6d	616e	onormalipsec-man
0A90	6461	746f	7279	3431	3320	5265	7175	6573	datory413 Reques
0AA0	7420	456e	7469	7479	2054	6f6f	204c	6172	t Entity Too Lar
0AB0	6765	3265	3138	3320	5365	7373	696f	6e20	ge2e183 Session
0AC0	5072	6f67	7265	7373	6374	7034	3836	2042	Progressctp486 B
0AD0	7573	7920	4865	7265	6d6f	7465	726d	696e	usy Heremotermin
0AE0	6174	6564	414b	4176	312d	4d44	352d	7365	atedAKAv1-MD5-se
0AF0	7373	696f	6e6f	6e65	0d0a	4175	7468	6f72	ssionone..Author
0B00	697a	6174	696f	6e3a	2036	3033	2044	6563	ization: 603 Dec
0B10	6c69	6e65	7874	6e6f	6e63	653d	3438	3520	linextnonce=485
0B20	416d	6269	6775	6f75	7365	726e	616d	653d	Ambiguoususername=
0B30	6175	6469	6f0d	0a43	6f6e	7465	6e74	2d54	audio..Content-T
0B40	7970	653a	204d	6172	200d	0a52	6563	6f72	ype: Mar ..Recor

0B50	642d	526f	7574	653a	204a	756c	2034	3031	d-Route: Jul 401
0B60	2055	6e61	7574	686f	7269	7a65	640d	0a52	Unauthorized..R
0B70	6571	7569	7265	3a20	0d0a	743d	3020	302e	equire: ..t=0 0.
0B80	302e	302e	300d	0a53	6572	7665	723a	2052	0.0.0..Server: R
0B90	4547	4953	5445	5220	0d0a	633d	494e	2049	EGISTER ..c=IN I
0BA0	5036	2031	3830	2052	696e	6769	6e67	3130	P6 180 Ringing10
0BB0	3020	5472	7969	6e67	763d	300d	0a6f	3d55	0 Tryingv=0..o=U
0BC0	5044	4154	4520	4e4f	5449	4659	200d	0a53	PDATe NOTIFY ..S
0BD0	7570	706f	7274	6564	3a20	756e	6b6e	6f77	upported: unknow
0BE0	6e41	4d52	5450	2f41	5650	200d	0a50	7269	nAMRTP/AVP ..Pri
0BF0	7661	6379	3a20	0d0a	5365	6375	7269	7479	vacy: ..Security
0C00	2d0d	0a45	7870	6972	6573	3a20	0d0a	613d	-..Expires: ..a=
0C10	7274	706d	6170	3a0d	0a6d	3d76	6964	656f	rtpmap:..m=video
0C20	200d	0a6d	3d61	7564	696f	200d	0a73	3d20	..m=audio ..s=
0C30	6661	6c73	650d	0a61	3d63	6f6e	663a	3b65	false..a=conf;;e
0C40	7870	6972	6573	3d0d	0a52	6f75	7465	3a20	xpires=..Route:
0C50	0d0a	613d	666d	7470	3a0d	0a61	3d63	7572	..a=fmtp:..a=cur
0C60	723a	436c	6965	6e74	3a20	5665	7269	6679	r:Client: Verify
0C70	3a20	0d0a	613d	6465	733a	0d0a	5241	636b	: ..a=des:..RAck
0C80	3a20	0d0a	5253	6571	3a20	4259	4520	636e	: ..RSeq: BYE cn
0C90	6f6e	6365	3d31	3030	7265	6c75	7269	3d71	once=100reluri=q
0CA0	6f70	3d54	4350	5544	5071	6f73	786d	6c3b	op=TCPUDPqosxml;
0CB0	6c72	0d0a	5669	613a	2053	4950	2f32	2e30	lr..Via: SIP/2.0
0CC0	2f54	4350	2034	3038	2052	6571	7565	7374	/TCP 408 Request
0CD0	2054	696d	656f	7574	696d	6572	7073	6970	Timeoutimerpsip
0CE0	3a0d	0a43	6f6e	7465	6e74	2d4c	656e	6774	:..Content-Lengt
0CF0	683a	204f	6374	200d	0a56	6961	3a20	5349	h: Oct ..Via: SI
0D00	502f	322e	302f	5544	5020	3b63	6f6d	703d	P/2.0/UDP ;comp=
0D10	7369	6763	6f6d	7072	6f62	6174	696f	6e61	sigcomprobationa
0D20	636b	3b62	7261	6e63	683d	7a39	6847	3462	ck;branch=z9hG4b
0D30	4b0d	0a4d	6178	2d46	6f72	7761	7264	733a	K..Max-Forwards:
0D40	2041	7072	2053	4354	5052	4143	4b20	494e	Apr SCTPRACK IN
0D50	5649	5445	200d	0a43	616c	6c2d	4944	3a20	VITE ..Call-ID:
0D60	0d0a	436f	6e74	6163	743a	2032	3030	204f	..Contact: 200 0
0D70	4b0d	0a46	726f	6d3a	200d	0a43	5365	713a	K..From: ..CSeq:
0D80	200d	0a54	6f3a	203b	7461	673d	0410	dd10	..To: ;tag=....
0D90	1131	0d11	0a07	10b9	0c10	fe12	10e1	0611	.1.....
0DA0	4e07	114e	0311	4a04	114a	0710	b208	1179	N..N..J..J.....y
0DB0	0611	810f	1122	0b11	5506	116b	0b11	6013	....."..U..k..`
0DC0	10b2	0811	7105	1187	1310	f709	0e8d	080d	....q.....
0DD0	ae0c	10b9	0710	8e03	0d96	0310	8a04	108a	.....
0DE0	090d	d70a	0f12	080f	8f09	0f8f	080d	6c06	.....l.
0DF0	0e66	090e	6c0a	0e6c	060f	c607	0fc6	0511	.f..l..l.....
0E00	4806	1148	060f	bf07	0fbf	070e	5506	0f16	H..H.....U...
0E10	040e	f403	0eb1	0310	a609	1050	0310	a30a	.....P....
0E20	0db4	050e	3606	0ed6	030d	f911	0ef8	040c	....6.....
0E30	d908	0eea	0409	5303	0a4b	040e	e410	0f35	.....S..K.....5
0E40	090e	e408	0d3f	030f	e10b	1001	0310	ac06?.....

0E50	1095	0c0e	760b	0feb	0a0f	ae05	102b	0410	....v.....+..
0E60	2b08	107a	100f	4907	0fb8	0910	3e0b	100c	+..z..I.....>..
0E70	070f	780b	0f6d	0910	4708	1082	0b0f	f608	..x..m..G.....
0E80	1062	080f	8708	106a	040f	780d	0fcd	080d	.b.....j..x.....
0E90	ae10	0f5d	0b0f	9814	0d20	1b0d	2004	0de0	...].....
0EA0	140e	b40b	0fa3	0b07	340f	0d56	040e	f403	.....4..V....
0EB0	10af	070d	3409	0f27	0410	9b04	109f	0910	....4..'.....
0EC0	5908	1072	0910	350a	1021	0a10	1708	0fe3	Y..r..5..!.....
0ED0	0310	a905	0cac	040c	bd07	0cc1	080c	c109	.....
0EE0	0cf6	100c	720c	0c86	040d	640c	0cd5	090c	....r.....d.....
0EF0	ff1b	0bfc	110c	5d13	0c30	090c	a40c	0c24	.....]..0.....\$
0F00	0c0d	3b03	0d1a	030d	1d16	0c43	090c	9209	..;.....C....
0F10	0c9b	0d0e	cb04	0d16	060d	1005	04f2	0b0c	.....
0F20	e105	0bde	0a0c	ec13	0be3	070b	d408	0d08	.....
0F30	0c0c	c909	0c3a	040a	e50c	0a23	080b	3a0e:.....#...:
0F40	09ab	0f0e	fa09	0f6f	0c0a	170f	0976	0c0a	.....o.....v..
0F50	5f17	0de2	0f07	a80a	0f85	0f08	d60e	09b9	-.....
0F60	0b0a	7a03	0bdb	0308	c104	0ec7	0308	d302	..z.....
0F70	048d	080b	4a05	0b8c	070b	6106	0548	0407	....J.....a..H..
0F80	f405	1030	0407	1e08	071e	050b	9110	04ca	...0.....
0F90	090a	7109	0e87	0504	9805	0b6e	0b04	9b0f	..q.....n....
0FA0	049b	0704	9b03	04a3	0704	a310	0798	0907	.....
0FB0	9805	0b73	050b	7805	0b7d	0507	b905	0b82	...s..x..}.....
0FC0	050b	8705	0b1d	0508	e405	0c81	050f	4405	.....D.
0FD0	1140	0508	7805	089d	050f	5805	073f	050c	..@..x.....X..?..
0FE0	6d05	10f2	050c	5805	06a9	0407	b609	058c	m.....X.....
0FF0	0606	1a06	0e81	0a06	160a	0ac4	070b	5a0a	.....Z.
1000	0aba	030b	1b04	1145	060c	8c07	05ad	0a0e	.....E.....
1010	da08	0b42	0d09	f70b	051c	0911	1608	05c9	...B.....
1020	070d	8606	0bcf	0a06	4d04	0ba2	0606	8d08	.....M.....
1030	05e6	080e	110b	0a9b	030a	0403	0bb5	0510	.....
1040	d704	0994	050a	e203	0bb2	060d	6704	0d11	.....g...
1050	0808	b71b	0e3b	0a09	a114	0485	1507	8315;
1060	076e	0d09	3d17	06ae	0f07	e614	07be	0d06	.n..=.....
1070	0a0d	0930	1606	f212	081e	2104	aa13	10c5	...0.....!.....
1080	080a	0f1c	0e96	180b	b81a	0595	1a05	7511	.....u.
1090	063d	1606	dc1e	0e19	1605	d11d	0620	2305	.=......#.
10A0	2711	087d	110d	9916	04da	0d0f	1c16	0708	'...}.....
10B0	1705	b40d	08c7	1307	f812	0857	1f04	fe19	.....W....
10C0	054e	1308	0b0f	08e9	1706	c513	067b	1905	.N.....{..
10D0	f115	0744	180d	fb0b	0f09	1b0d	be12	0830	...D.....0
10E0	1507	5904	0ba6	040b	ae04	0b9e	040b	9604	..Y.....
10F0	0b9a	0a0a	b00b	0a90	080b	320b	096b	080b	.....2..k..
1100	2a0b	0a85	090b	120a	0aa6	0d09	ea13	0d74	*.....t
1110	1407	d213	090b	1208	4210	095b	1209	1e0d	.....B..[....
1120	0cb1	0e0c	1711	094a	0c0a	530c	0a47	090a	.....J..S..G..
1130	f70e	09c7	0c0a	3b07	0669	0806	6906	09e3	.....;..i..i...
1140	080b	520a	0ad8	1206	570d	0657	0709	e304	..R.....W..W....

1150	0ae9	1007	3009	0b00	0c0a	2f05	0ae9	050a	....0...../.....
1160	6b06	0a6b	0a0a	ce09	0aee	030b	db07	0f7e	k..k.....~
1170	0a09	970a	0671	0e09	d517	0693	070e	5c07	.....q.....\.
1180	0fda	0a0f	350d	0dec	0a09	970a	0671	080b	....5.....q..
1190	220f	0985	060b	680c	0d4a	090b	0913	08f8	".....h..J.....
11A0	1508	a204	0baa	0f05	660d	0723	090a	060b	.....f..#....
11B0	0d4a	0f04	ee06	04f8	0409	2b04	0853	0708	.J.....+..S..
11C0	c003	111f	0411	1e07	0d8c	0307	3404	10db	.....4....
11D0	0307	3603	0da9	0d04	200b	0451	0c04	3a04	..6.....Q...:
11E0	0bb8	040c	2404	0595	0404	7c04	0575	0404	....\$.....|..u..
11F0	8504	096b	0406	3d06	047b	0406	dc04	0783	...k..=..{.....
1200	040e	1912	0400	1008	8e10	0869	0e04	120d	.....i....
1210	042d	0310	b904	05d1	0407	6e04	0620	0704	.-.....n.. ..
1220	7404	0bfc	0a04	5c04	0527	0409	3d04	087d	t.....\..'..=..}
1230	040f	ae04	0d99	0406	ae04	04da	0904	0908	.....
1240	1122	040f	1c04	07e6	040e	cb05	08bd	0407	.."......
1250	0804	0fa3	0406	5704	05b4	040f	5d04	08c7	.....W.....]...
1260	080b	f404	07f8	0407	3004	07be	0408	5705	.....0.....W.
1270	0d46	0404	fe04	060a	0405	4e04	0e3b	0408	.F.....N..;..
1280	0b04	0930	0408	e905	05ee	0406	c504	06f2	...0.....
1290	0406	7b04	09a1	0405	f104	081e	0407	4404	..{.....D.
12A0	0bdd	040d	fb04	04aa	040b	e307	0eee	040f	.....
12B0	0904	0eb4	040d	be04	10c5	0408	3005	0f30	.....0..0
12C0	0407	5904	0a0f	060e	6104	0481	040d	ab04	..Y.....a.....
12D0	0d93	0411	6b04	0e96	0504	6609	046b	0b04	....k.....f..k..
12E0	4604	0ce1							F...

Table 1: binary representation of the static SIP/SDP dictionary for SigComp

4. Security Considerations

The security considerations of [1] apply. This memo does not introduce any known additional security risk.

5. IANA Considerations

None.

6. Acknowledgements

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Appendix A. SIP input strings to the SIP/SDP static dictionary

For reference, this section lists the SIP input strings that were used in generating the dictionary, as well as a priority value, the offset of the string in the generated dictionary, the length of the string, and one or more references into the referenced documents that motivate the presence of this string. Note that the notation "[CRLF]" stands for a sequence of two bytes with the values 0x0d and 0x0a, respectively.

The priority value is used for determining the position of the string in the dictionary. Lower priority values (higher priorities) cause the string to occur at a later position in the dictionary, making it more efficient to reference the string in certain compression algorithms. Hence, lower priority values were assigned to strings more likely to occur.

String	Pr	Off	Len	References
=====	==	=====	=====	=====
"sip:"	1	0CDD	0004	[3] 19.1.1
"sips:"	3	08AC	0005	[3] 19.1.1
"tel:"	3	08BD	0004	[7] 2.2
"SIP/2.0"	1	0CB9	0007	[3] 25.1
"SIP/2.0/UDP "	1	0CFE	000C	[3] 25.1
"SIP/2.0/TCP "	2	0CB9	000C	[3] 25.1
"INVITE"	1	0D4E	0006	[3] 25.1
"INVITE "	1	0D4E	0007	[3] 25.1
"ACK"	1	0D4A	0003	[3] 25.1
"ACK "	1	0D4A	0004	[3] 25.1
"OPTIONS"	4	0269	0007	[3] 25.1
"OPTIONS "	4	0269	0008	[3] 25.1
"BYE"	2	0C8A	0003	[3] 25.1
"BYE "	2	0C8A	0004	[3] 25.1
"CANCEL"	4	05E3	0006	[3] 25.1
"CANCEL "	4	05E3	0007	[3] 25.1
"REGISTER"	2	0B8F	0008	[3] 25.1
"REGISTER "	2	0B8F	0009	[3] 25.1
"INFO"	4	06E9	0004	[8] 2
"INFO "	4	06E9	0005	[8] 2
"SUBSCRIBE"	2	0A6C	0009	[9] 8.1.1
"SUBSCRIBE "	2	0A6C	000A	[9] 8.1.1
"NOTIFY"	2	0BC6	0006	[9] 8.1.2
"NOTIFY "	2	0BC6	0007	[9] 8.1.2
"PRACK"	2	0D48	0005	[10] 6
"PRACK "	2	0D48	0006	[10] 6
"UPDATE"	2	0BBF	0006	[11] 7, 10
"UPDATE "	2	0BBF	0007	[11] 7, 10
"REFER"	4	066B	0005	[13] 2.1, 7

"REFER "	4	066B	0006	[13]	2.1, 7
"MESSAGE"	3	08C1	0007	[21]	9
"MESSAGE "	3	08C1	0008	[21]	9
"[CRLF]Accept: "	4	06CE	000A	[3]	20.1
"[CRLF]Accept-"	4	06EE	0009	[22]	5,
			[3]	20.2, 20.3	
"Contact: "	5	0009	0009	[22]	5
"Encoding: "	4	0597	000A	[3]	20.2,
			[3]	20.12	
"Language: "	4	0271	000A	[3]	20.3,
			[3]	20.13	
"[CRLF]Alert-Info: "	4	05D5	000E	[3]	20.4
"[CRLF]Allow: "	3	08F6	0009	[3]	20.5
"[CRLF]Allow-Events: "	3	0872	0010	[9]	8.2.1
"[CRLF]Authentication-Info: "	4	0293	0017	[3]	20.6
"[CRLF]Authorization: "	2	0AF8	0011	[3]	20.7
"[CRLF]Call-ID: "	1	0D55	000B	[3]	20.8
"[CRLF]Call-Info: "	5	002D	000D	[3]	20.9
"[CRLF]Contact: "	1	0D60	000B	[3]	20.10
"[CRLF]Content-"	4	0B35	000A	[3]	20.11,
				20.12, 20.13, [3]	20.14,
				20.15	
"Disposition: "	4	09EC	000D	[3]	20.11
"Encoding: "	4	0597	000A	[3]	20.2,
			[3]	20.12	
"Language: "	4	0271	000A	[3]	20.3,
			[3]	20.13	
"[CRLF]Content-Length: "	1	0CE1	0012	[3]	20.14
"[CRLF]Content-Type: "	2	0B35	0010	[3]	20.15
"[CRLF]CSeq: "	1	0D79	0008	[3]	20.16
"[CRLF]Date: "	4	0722	0008	[3]	20.17
"[CRLF]Error-Info: "	5	0012	000E	[3]	20.18
"[CRLF]Event: "	3	08FF	0009	[9]	8.2.1
"[CRLF]Expires: "	2	0C01	000B	[3]	20.19
"[CRLF]From: "	1	0D71	0008	[3]	20.20
"[CRLF]In-Reply-To: "	4	0585	000F	[3]	20.21
"[CRLF]Max-Forwards: "	1	0D31	0010	[3]	20.22
"[CRLF]Min-"	4	0768	0006	[3]	20.23,
			[18]	5	
"Expires: "	4	083A	0009	[3]	20.23
"SE: "	4	06E5	0004	[18]	5
"[CRLF]MIME-Version: "	5	0469	0010	[3]	20.24
"[CRLF]Organization: "	5	048E	0010	[3]	20.25
"[CRLF]Path: "	3	0908	0008	[16]	3
"[CRLF]Priority: "	4	0623	000C	[3]	20.26
"[CRLF]Privacy: "	2	0BEB	000B	[33]	4.2
"[CRLF]Proxy-"	4	073A	0008	[3]	20.27,
				20.28, 20.29	

"Authenticate: "	4	05AB	000E	[3]	20.27
"Authorization: "	4	0AFA	000F	[3]	20.28
"Require: "	4	0B6F	0009	[3]	20.29
"[CRLF]RAck: "	2	0C7A	0008	[10]	7.2
"[CRLF]Reason: "	3	08EC	000A	[17]	2
"[CRLF]Record-Route: "	2	0B49	0010	[3]	20.30
"[CRLF]Refer-To: "	4	0617	000C	[13]	2.1, 7
"[CRLF]Referred-By: "	4	0576	000F	[34]	9
"[CRLF]Reject-Contact: "	5	0000	0012	[22]	5
"[CRLF]Replaces: "	4	065F	000C	[14]	3.1
"[CRLF]Reply-To: "	5	003A	000C	[3]	20.31
"[CRLF]Request-Disposition: "	4	09E2	0017	[22]	5
"[CRLF]Require: "	2	0B6D	000B	[3]	20.32
"[CRLF]Retry-After: "	4	03A8	000F	[3]	20.33
"[CRLF]Route: "	2	0C47	0009	[3]	20.34
"[CRLF]RSeq: "	2	0C82	0008	[10]	7.1
"[CRLF]Security-"	2	0BF6	000B	[20]	3.3
"Client: "	2	0C62	0008	[20]	3.3
"Server: "	2	0B87	0008	[20]	3.3
"Verify: "	2	0C6A	0008	[20]	3.3
"[CRLF]Server: "	4	0B85	000A	[3]	20.35
"[CRLF]Service-Route: "	3	085D	0011	[35]	
"[CRLF]Session-Expires: "	3	0830	0013	[18]	4
"[CRLF]Subject: "	5	0051	000B	[3]	20.36
"[CRLF]Subscription-State: "	3	0843	0016	[9]	8.2.3
"[CRLF]Supported: "	2	0BCD	000D	[3]	20.37
"[CRLF]Timestamp: "	5	0020	000D	[3]	20.38
"[CRLF]To: "	1	0D81	0006	[3]	20.39
"[CRLF]Unsupported: "	4	04D6	000F	[3]	20.40
"[CRLF]User-Agent: "	4	05B9	000E	[3]	20.41
"[CRLF]Via: "	1	0CB2	0007	[3]	20.42
"[CRLF]Via: SIP/2.0/UDP "	1	0CF7	0013	[3]	20.42
"[CRLF]Via: SIP/2.0/TCP "	1	0CB2	0013	[3]	20.42
"[CRLF]Warning: "	5	0046	000B	[3]	20.43
"[CRLF]WWW-Authenticate: "	2	0920	0014	[3]	20.44
"[CRLF]WWW-Authenticate: Digest "	2	0920	001B	[3]	20.44
"[CRLF][CRLF]"	2	09E0	0004	[3]	7
";transport="	4	067A	000B	[3]	25.1
"udp"	4	07DB	0003	[3]	25.1,
			[24]	A, [3]	25.1, [24] A
"tcp"	4	04C1	0003	[3]	25.1
"sctp"	4	0AC7	0004	[3]	25.1
"tls"	4	04D3	0003	[3]	25.1,
			[20]	3.3	
";user="	3	0910	0006	[3]	25.1
"phone"	3	00F2	0005	[3]	25.1
"ip"	4	008D	0002	[3]	25.1
";method="	4	074A	0008	[3]	25.1

";ttl="	4	078C	0005	[3]	25.1	
";lr"	2	0CAF	0003	[3]	25.1	
"Digest "	2	0934	0007	[6]	3.2.1,	
					3.2.2	
"username="	2	0B27	0009	[6]	3.2.2	
"uri="	2	0C9B	0004	[6]	3.2.2	
"qop="	2	0C9F	0004	[6]	3.2.1,	
					3.2.2	
"cnonce="	2	0C8E	0007	[6]	3.2.2	
"nc="	2	0996	0003	[6]	3.2.2	
"response="	2	09D7	0009	[6]	3.2.2	
"nextnonce="	2	0B12	000A	[6]	3.2.3	
"rspauth="	2	096C	0008	[6]	3.2.3	
"realm="	2	0A66	0006	[6]	3.2.1	
"domain="	2	0A55	0007	[6]	3.2.1	
"nonce="	2	0B16	0006	[6]	3.2.1	
"opaque="	4	0761	0007	[6]	3.2.1	
"stale="	4	0148	0006	[6]	3.2.1	
"true"	4	03F4	0004	[6]	3.2.1	
"false"	4	0C30	0005	[6]	3.2.1	
"algorithm="	2	09B4	000A	[6]	3.2.1,	
				[19]	3.1	
"MD5"	2	09F9	0003	[6]	3.2.1,	
				[19]	3.1	
"MD5-sess"	2	0AEA	0008	[6]	3.2.1,	
				[19]	3.1	
"auth"	4	031E	0004	[6]	3.2.1	
"auth-int"	4	031E	0008	[6]	3.2.1	
"AKAv"	2	0AE4	0004	[19]	3.1,	6
"AKAv1-MD5"	2	0AE4	0009	[19]	3.1,	6
"auts="	4	0791	0005	[19]	3.4	
"digest-integrity"	4	00CA	0010	[20]	3.3	
"ipsec-ike"	4	0671	0009	[20]	3.3	
"ipsec-man"	4	0A87	0009	[20]	3.3	
"smime"	4	0098	0005	[20]	3.3	
";alg="	4	076E	0005	[20]	3.3	
";purpose="	5	006B	0009	[3]	20.9	
"icon"	5	0993	0004	[3]	20.9,	20.11
"info"	5	09AB	0004	[3]	20.9	
"card"	5	0081	0004	[3]	20.9	
";expires="	2	0C3E	0009	[3]	25.1,	
				[9]	8.4	
"render"	5	0A61	0006	[3]	20.11	
"session"	5	0AEE	0007	[3]	20.11,	
				[33]	4.2	
"alert"	5	04BD	0005	[3]	20.11	
";handling="	5	005C	000A	[3]	20.11	
"optional"	2	09AE	0008	[3]	20.11,	

			[12]	4,	[3]	20.11,	[12]	4
"required"	5	07F4	0008	[3]		20.11		
"text"	5	007C	0004	[3]		25.1		
"image"	5	0066	0005	[3]		25.1		
"audio"	5	0B30	0005	[3]		25.1		
"video"	5	0946	0005	[3]		25.1		
"application"	2	0334	000B	[3]		25.1		
"application/sdp"	2	0956	000F	[3]		25.1		
"message/sip"	4	009B	000B	[3]		27.5		
"message/sipfrag"	4	009B	000F	[15]		2		
"message"	4	009B	0007	[3]		27.5,		
				[15]		2		
"sip"	4	00A3	0003	[3]		27.5		
"sipfrag"	4	00A3	0007	[15]		2		
"multipart/signed"	4	0398	0010	[3]		23.3		
"multipart"	4	0398	0009	[3]		25.1,	7.4.1	
"sdp"	2	064B	0003					
"xml"	2	0CAC	0003					
"Mon, "	4	0773	0005	[3]		25.1		
"Tue, "	4	0778	0005	[3]		25.1		
"Wed, "	4	077D	0005	[3]		25.1		
"Thu, "	4	03B9	0005	[3]		25.1		
"Fri, "	4	0782	0005	[3]		25.1		
"Sat, "	4	0787	0005	[3]		25.1		
"Sun, "	4	071D	0005	[3]		25.1		
" Jan "	4	04E4	0005	[3]		25.1		
" Feb "	4	0881	0005	[3]		25.1		
" Mar "	4	0B44	0005	[3]		25.1		
" Apr "	4	0D40	0005	[3]		25.1		
" May "	4	0478	0005	[3]		25.1		
" Jun "	4	049D	0005	[3]		25.1		
" Jul "	4	0B58	0005	[3]		25.1		
" Aug "	4	033F	0005	[3]		25.1		
" Sep "	4	086D	0005	[3]		25.1		
" Oct "	4	0CF2	0005	[3]		25.1		
" Nov "	4	0858	0005	[3]		25.1		
" Dec "	4	02A9	0005	[3]		25.1		
" GMT"	4	03B6	0004	[3]		25.1		
";tag="	1	0D87	0005	[3]		25.1		
"emergency"	4	018C	0009	[3]		20.26		
"urgent"	4	021A	0006	[3]		20.26		
"normal"	4	0A81	0006	[3]		20.26		
"non-urgent"	4	0216	000A	[3]		20.26		
";duration="	4	06C4	000A	[3]		20.33		
";maddr="	4	075A	0007	[3]		20.42		
";received="	4	06BA	000A	[3]		20.42		
";branch="	5	0D22	0008	[3]		20.42		
";branch=z9hG4bK"	1	0D22	000F	[3]		8.1.1.7		

"SIP"	5	0CB9	0003	[3]	25.1,
		[17]	2		
"UDP"	2	0CA6	0003	[3]	20.42
"TCP"	2	0CA3	0003	[3]	20.42
"TLS"	4	071B	0003	[3]	20.42
"SCTP"	4	0D45	0004	[3]	20.42
"active"	4	088C	0006	[9]	8.4
"pending"	4	01AD	0007	[9]	8.4
"terminated"	4	0ADA	000A	[9]	8.4
";reason="	4	0742	0008	[9]	8.4
";retry-after="	4	05F7	000D	[9]	8.4
"deactivated"	4	011C	000B	[9]	8.4
"probation"	4	0D16	0009	[9]	8.4
"rejected"	4	01C9	0008	[9]	8.4
"timeout"	4	0986	0007	[9]	8.4
"giveup"	4	07CF	0006	[9]	8.4
"noresource"	4	024D	000A	[9]	8.4
";id="	4	07A2	0004	[9]	8.4
"100rel"	2	0C95	0006	[10]	8.1
"precondition"	2	0A76	000C	[12]	8
"refer"	3	07DE	0005	[13]	3.1, 7
"to-tag"	4	028D	0006	[14]	3.2
"from-tag"	4	01E6	0008	[14]	3.2
"replaces"	4	0A11	0008	[14]	3.4
"Q.850"	5	01EE	0005	[17]	2
";cause="	5	0074	0007	[17]	2
";text="	5	007B	0006	[17]	2
"path"	3	0964	0004	[16]	3
";refresher="	4	069B	000B	[18]	4
"uac"	4	0604	0003	[18]	4
"uas"	4	07B5	0003	[18]	4
"timer"	4	0CD7	0005	[18]	7.1
"pref"	5	07DD	0004	[22]	4.1
"TRUE"	4	0594	0004	[22]	6.2
"FALSE"	4	06E2	0005	[22]	6.2
";q="	4	07B2	0003	[3]	25.1,
		[22]	6.2,	[20]	3.3
";comp=sigcomp"	1	0D0A	000D	[23]	6
"privacy"	3	07D4	0007	[33]	4.2
"header"	4	0967	0006	[33]	4.2
"user"	4	0911	0004	[33]	4.2
"none"	2	0AF4	0004	[33]	4.2,
		[12]	4		
"critical"	4	04B7	0008	[33]	4.2
"100 "	5	0BAE	0004	[3]	21.1.1
"100 Trying"	2	0BAE	000A	[3]	21.1.1
"180 "	5	0BA3	0004	[3]	21.1.2
"180 Ringing"	2	0BA3	000B	[3]	21.1.2

"181 "	5	0A3B	0004	[3]	21.1.3
"181 Call Is Being Forwarded"	4	0A3B	001B	[3]	21.1.3
"182 "	5	05A1	0004	[3]	21.1.4
"182 Queued"	4	05A1	000A	[3]	21.1.4
"183 "	5	0AB4	0004	[3]	21.1.5
"183 Session Progress"	2	0AB4	0014	[3]	21.1.5
"200 "	5	0D6B	0004	[3]	21.2.1
"200 OK"	1	0D6B	0006	[3]	21.2.1
"202 "	5	0824	0004	[9]	8.3.1
"202 Accepted"	3	0824	000C	[9]	8.3.1
"300 "	5	0085	0004	[3]	21.3.1
"300 Multiple Choices"	4	0085	0014	[3]	21.3.1
"301 "	5	0383	0004	[3]	21.3.2
"301 Moved Permanently"	4	0383	0015	[3]	21.3.2
"302 "	5	036E	0004	[3]	21.3.3
"302 Moved Temporarily"	4	036E	0015	[3]	21.3.3
"305 "	5	053D	0004	[3]	21.3.4
"305 Use Proxy"	4	053D	000D	[3]	21.3.4
"380 "	5	02AE	0004	[3]	21.3.5
"380 Alternative Service"	4	02AE	0017	[3]	21.3.5
"400 "	5	03E6	0004	[3]	21.4.1
"400 Bad Request"	4	03E6	000F	[3]	21.4.1
"401 "	5	0B5D	0004	[3]	21.4.2
"401 Unauthorized"	2	0B5D	0010	[3]	21.4.2
"402 "	5	03BE	0004	[3]	21.4.3
"402 Payment Required"	4	03BE	0014	[3]	21.4.3
"403 "	5	020A	0004	[3]	21.4.4
"403 Forbidden"	4	020A	000D	[3]	21.4.4
"404 "	5	0530	0004	[3]	21.4.5
"404 Not Found"	4	0530	000D	[3]	21.4.5
"405 "	5	02F2	0004	[3]	21.4.6
"405 Method Not Allowed"	4	02F2	0016	[3]	21.4.6
"406 "	5	041E	0004	[3]	21.4.7
"406 Not Acceptable"	4	041E	0012	[3]	21.4.7
"407 "	5	00AA	0004	[3]	21.4.8
"407 Proxy Authentication Required"	4	00AA	0021	[3]	21.4.8
"408 "	5	0CC5	0004	[3]	21.4.9
"408 Request Timeout"	4	0CC5	0013	[3]	21.4.9
"410 "	5	060F	0004	[3]	21.4.10
"410 Gone"	4	060F	0008	[3]	21.4.10
"413 "	5	0A96	0004	[3]	21.4.11
"413 Request Entity Too Large"	4	0A96	001C	[3]	21.4.11
"414 "	5	07B8	0004	[3]	21.4.12
"414 Request-URI Too Long"	4	07B8	0018	[3]	21.4.12
"415 "	5	0195	0004	[3]	21.4.13
"415 Unsupported Media Type"	4	0195	001A	[3]	21.4.13
"416 "	5	0175	0004	[3]	21.4.14
"416 Unsupported URI Scheme"	4	0175	001A	[3]	21.4.14

"420 "	5	023D	0004	[3]	21.4.15
"420 Bad Extension"	4	023D	0011	[3]	21.4.15
"421 "	5	02DC	0004	[3]	21.4.16
"421 Extension Required"	4	02DC	0016	[3]	21.4.16
"422 "	5	0A19	0004	[18]	6, 12.1
"422 Session Interval Too Small"	4	0A19	001E	[18]	6, 12.2
"423 "	5	01D1	0004	[3]	21.4.17
"423 Interval Too Brief"	4	01D1	0016	[3]	21.4.17
"429 "	5	0220	0004	[34]	9
"429 Provide Referrer Identity"	4	0220	001D	[34]	9
"480 "	5	07FC	0004	[3]	21.4.18
"480 Temporarily Unavailable"	3	07FC	001B	[3]	21.4.18
"481 "	5	0127	0004	[3]	21.4.19
"481 Call/Transaction Does Not Exist"	4	0127	0023	[3]	21.4.19
"482 "	5	047D	0004	[3]	21.4.20
"482 Loop Detected"	4	047D	0011	[3]	21.4.20
"483 "	5	0999	0004	[3]	21.4.21
"483 Too Many Hops"	4	0999	0011	[3]	21.4.21
"484 "	5	00DA	0004	[3]	21.4.22
"484 Address Incomplete"	4	00DA	0016	[3]	21.4.22
"485 "	5	0B1C	0004	[3]	21.4.23
"485 Ambiguous"	4	0B1C	000D	[3]	21.4.23
"486 "	5	0ACB	0004	[3]	21.4.24
"486 Busy Here"	3	0ACB	000D	[3]	21.4.24
"487 "	5	0308	0004	[3]	21.4.25
"487 Request Terminated"	4	0308	0016	[3]	21.4.25
"488 "	5	01B4	0004	[3]	21.4.26
"488 Not Acceptable Here"	4	01B4	0017	[3]	21.4.26
"489 "	5	04C7	0004	[9]	8.3.2
"489 Bad Event"	4	04C7	000D	[9]	8.3.2
"491 "	5	03F8	0004	[3]	21.4.27
"491 Request Pending"	4	03F8	0013	[3]	21.4.27
"493 "	5	0457	0004	[3]	21.4.28
"493 Undecipherable"	4	0457	0012	[3]	21.4.28
"494 "	5	00FE	0004	[20]	3.3.1
"494 Security Agreement Required"	4	00FE	001F	[20]	3.3.1
"500 "	5	014E	0004	[3]	21.5.1
"500 Server Internal Error"	4	014E	0019	[3]	21.5.1
"501 "	5	040B	0004	[3]	21.5.2
"501 Not Implemented"	4	040B	0013	[3]	21.5.2
"502 "	5	04E9	0004	[3]	21.5.3
"502 Bad Gateway"	4	04E9	000F	[3]	21.5.3
"503 "	5	02C5	0004	[3]	21.5.4
"503 Service Unavailable"	4	02C5	0017	[3]	21.5.4
"504 "	5	027B	0004	[3]	21.5.5
"504 Server Time-out"	4	027B	0013	[3]	21.5.5
"505 "	5	01F1	0004	[3]	21.5.6
"505 Version Not Supported"	4	01F1	0019	[3]	21.5.6

"513 "	5	0344	0004	[3]	21.5.7
"513 Message Too Large"	4	0344	0015	[3]	21.5.7
"580 "	5	09FB	0004	[12]	8
"580 Precondition Failure"	4	09FB	0018	[12]	8
"600 "	5	07E3	0004	[3]	21.6.1
"600 Busy Everywhere"	3	07E3	0013	[3]	21.6.1
"603 "	5	0B09	0004	[3]	21.6.2
"603 Decline"	4	0B09	000B	[3]	21.6.2
"604 "	5	09BE	0004	[3]	21.6.3
"604 Does Not Exist Anywhere"	4	09BE	001B	[3]	21.6.3
"606 "	5	0430	0004	[3]	21.6.4
"606 Not Acceptable"	4	0430	0012	[3]	21.6.4
"687 "	5	0359	0004	[14]	3.5
"687 Dialog Terminated"	4	0359	0015	[14]	3.5
"Anonymous"	3	08A4	0009	[3]	8.1.1.3

Table A.1: SIP input strings for the SIP/SDP dictionary

Appendix B. SDP input strings to the SIP/SDP static dictionary

For reference, this section lists the SDP input strings that were used in generating the dictionary, as well as a priority value, the offset of the string in the generated dictionary, the length of the string, and one or more references into the referenced documents that motivate the presence of this string. Note that the notation "[CRLF]" stands for a sequence of two bytes with the values 0x0d and 0x0a, respectively.

The priority value is used for determining the position of the string in the dictionary. Lower priority values (higher priorities) cause the string to occur at a later position in the dictionary, making it more efficient to reference the string in certain compression algorithms. Hence, lower priority values were assigned to strings more likely to occur.

String	Pr	Off	Len	References
=====	==	=====	=====	=====
"v=0[CRLF]o="	2	0BB8	0007	[24] 6
"[CRLF]s="	2	0C2B	0004	[24] 6
"[CRLF]s= "	2	0C2B	0005	[32] 5
"[CRLF]i="	4	07A6	0004	[24] 6
"[CRLF]u="	4	07AE	0004	[24] 6
"[CRLF]e="	4	079E	0004	[24] 6
"[CRLF]c=IN IP4 "	3	08E1	000B	[24] 6
"[CRLF]c=IN IP6 "	2	0B98	000B	[24] 6
"[CRLF]c="	5	08E1	0004	[24] 6
"[CRLF]b="	3	0916	0004	[24] 6
"[CRLF]t="	2	0B78	0004	[24] 6
"[CRLF]t=0 0"	2	0B78	0007	[32] 5
"[CRLF]r="	4	0796	0004	[24] 6
"[CRLF]z="	4	079A	0004	[24] 6
"[CRLF]k=clear:"	4	06B0	000A	[24] 6
"[CRLF]k=base64:"	4	0690	000B	[24] 6
"[CRLF]k=uri:"	4	0732	0008	[24] 6
"[CRLF]k=prompt:"	4	056B	000B	[24] 6
"[CRLF]k="	5	056B	0004	[24] 6
"[CRLF]a=cat:"	4	072A	0008	[24] 6
"[CRLF]a=keywds:"	4	0685	000B	[24] 6
"[CRLF]a=tool:"	4	0712	0009	[24] 6
"[CRLF]a=ptime:"	4	06A6	000A	[24] 6
"[CRLF]a=maxptime:"	4	05EA	000D	[24] 6
"[CRLF]a=rtpmap:"	2	0C0C	000B	[24] 6, [32] 5
"[CRLF]a=recvonly"	3	08C9	000C	[24] 6
"[CRLF]a=sendrecv"	3	093B	000C	[24] 6
"[CRLF]a=sendonly"	3	08D5	000C	[24] 6
"[CRLF]a=inactive"	3	0886	000C	[24] 6

"[CRLF]a=orient:portrait"	4	0974	0013	[24]	6
"[CRLF]a=orient:landscape"	4	03D2	0014	[24]	6
"[CRLF]a=orient:seascape"	4	050B	0013	[24]	6
"[CRLF]a=type:broadcast"	4	0442	0012	[24]	6
"[CRLF]a=type:meeting"	4	055B	0010	[24]	6
"[CRLF]a=type:moderated"	4	051E	0012	[24]	6
"[CRLF]a=type:test"	4	08B1	000D	[24]	6
"[CRLF]a=type:H.332"	4	0817	000E	[24]	6
"[CRLF]a=type:recvonly"	4	054A	0011	[24]	6
"[CRLF]a=charset:"	4	0653	000C	[24]	6
"[CRLF]a=sdplang:"	4	0647	000C	[24]	6
"[CRLF]a=lang:"	4	06F7	0009	[24]	6
"[CRLF]a=framerate:"	4	05C7	000E	[24]	6
"[CRLF]a=quality:"	4	063B	000C	[24]	6
"[CRLF]a=fmtp:"	2	0C50	0009	[24]	6
"[CRLF]a=curr:"	2	0C59	0009	[12]	4
"[CRLF]a=des:"	2	0C72	0008	[12]	4
"[CRLF]a=conf:"	2	0C35	0009	[12]	4
"[CRLF]a=mid:"	4	0752	0008	[26]	3
"[CRLF]a=group:"	4	06D8	000A	[26]	3
"[CRLF]a=key-mgmt:mikey"	4	0257	0012	[28]	2.1,
		[29]	6		
"[CRLF]a=key-mgmt:"	4	0257	000D	[28]	2.1
"[CRLF]a="	5	0257	0004	[24]	6
"[CRLF]m=audio "	2	0C21	000A	[24]	6
"[CRLF]m=video "	2	0C17	000A	[24]	6
"[CRLF]m=application "	4	0330	0010	[24]	6
"[CRLF]m=data "	4	0700	0009	[24]	6
"[CRLF]m=control "	4	062F	000C	[24]	6
"[CRLF]m="	5	0330	0004	[24]	6
"AS "	3	091A	0003	[24]	6
"CT "	3	091D	0003	[24]	6
"RTP/AVP "	2	0BE3	0008	[24]	A
"RTP/SAVP "	3	0892	0009	[30]	12
"RTP/AVPF "	3	089B	0009	[31]	4.1
"udp"	4	07DB	0003	[3]	25.1,
		[24]	A, [3]	25.1, [24]	A
"0.0.0.0"	4	0B7E	0007	[24]	A
"qos"	2	0CA9	0003	[12]	4
"mandatory"	2	0A8D	0009	[12]	4
"optional"	2	09AE	0008	[3]	20.11,
		[12]	4, [3]	20.11, [12]	4
"none"	2	0AF4	0004	[33]	4.2,
		[12]	4		
"failure"	4	0A5C	0007	[12]	4
"unknown"	4	0BDA	0007	[12]	4
"e2e"	2	0AB1	0003	[12]	4
"local"	2	0A36	0005	[12]	4

"remote"	2	0AD6	0006	[12]	4	
"send"	2	08D9	0004	[12]	4	
"recv"	2	0553	0004	[12]	4	
"sendrecv"	2	093F	0008	[12]	4	
"AMR"	2	0BE1	0003	[25]	8	
"octet-align="	4	094A	000C	[25]	8	
"mode-set="	4	0709	0009	[25]	8	
"mode-change-period="	4	04F8	0013	[25]	8	
"mode-change-neighbor="	4	04A2	0015	[25]	8	
"crc="	4	07AA	0004	[25]	8	
"robust-sorting="	4	0166	000F	[25]	8	
"interleaving="	4	0323	000D	[25]	8	
"channels="	4	0606	0009	[25]	8	
"octet-align"	4	094A	000B	[25]	8	
"telephone-event"	4	00EE	000F	[27]	3.3, 6.1	
"events"	4	00F8	0006	[27]	6.1	
"rate"	4	052B	0004	[27]	6.1, 6.2	
"tone"	4	0453	0004	[27]	6.2	
"rtcp-fb"	4	04C0	0007	[31]	4	
"ack"	4	0D1F	0003	[31]	4	
"nack"	4	0D1E	0004	[31]	4	
"ttr-int"	4	098C	0007	[31]	4	
"app"	4	0334	0003	[31]	4	
"rpsi"	4	0CDB	0004	[31]	4	
"pli"	4	0336	0003	[31]	4	
"sli"	4	09A9	0003	[31]	4	

Table B.1: SDP input strings for the SIP/SDP dictionary

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