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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.

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## 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<br>desired | String<br>offset | String<br>length | Table<br>offset | Table<br>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 Brieffrom-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 | questrue491 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 ywhererequired480
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 Hopslinfo     |
| 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=fmt:..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 | .....?.....      |

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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....

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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             |

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"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

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|                    |   |      |      |      |                    |
|--------------------|---|------|------|------|--------------------|
| " ;ttl="           | 4 | 078C | 0005 | [3]  | 25.1               |
| " ;lr"             | 2 | 0CAF | 0003 | [3]  | 25.1               |
| "Digest "          | 2 | 0934 | 0007 | [6]  | 3.2.1,<br>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,<br>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,<br>[19] 3.1 |
| "MD5"              | 2 | 09F9 | 0003 | [6]  | 3.2.1,<br>[19] 3.1 |
| "MD5-sess"         | 2 | 0AEA | 0008 | [6]  | 3.2.1,<br>[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,<br>[9] 8.4   |
| "render"           | 5 | 0A61 | 0006 | [3]  | 20.11              |
| "session"          | 5 | 0AEE | 0007 | [3]  | 20.11,<br>[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,<br>[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,<br>[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,<br>[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,<br>[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,<br>[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,<br>[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,<br>[12] 4, [3] 20.11, [12] 4 |
| "none"                     | 2 | 0AF4 | 0004 | [33] | 4.2,<br>[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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