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A Protocol for Remotely Managing Sieve Scripts

Abstract

Sieve scripts allow users to filter incoming email. Message stores are commonly sealed servers so users cannot log into them, yet users must be able to update their scripts on them. This document describes a protocol "ManageSieve" for securely managing Sieve scripts on a remote server. This protocol allows a user to have multiple scripts, and also alerts a user to syntactically flawed scripts.

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction

1.1. Commands and Responses

A ManageSieve connection consists of the establishment of a client/server network connection, an initial greeting from the server, and client/server interactions. These client/server interactions consist of a client command, server data, and a server completion result response.

All interactions transmitted by client and server are in the form of lines, that is, strings that end with a CRLF. The protocol receiver of a ManageSieve client or server is either reading a line or reading a sequence of octets with a known count followed by a line.

1.2. Syntax

ManageSieve is a line-oriented protocol much like [IMAP] or [ACAP], which runs over TCP. There are three data types: atoms, numbers and strings. Strings may be quoted or literal. See [ACAP] for detailed descriptions of these types.

Each command consists of an atom (the command name) followed by zero or more strings and numbers terminated by CRLF.

All client queries are replied to with either an OK, NO, or BYE response. Each response may be followed by a response code (see Section 1.3) and by a string consisting of human-readable text in the local language (as returned by the LANGUAGE capability; see Section 1.7), encoded in UTF-8 [UTF-8]. The contents of the string SHOULD be shown to the user ,and implementations MUST NOT attempt to parse the message for meaning.

The BYE response SHOULD be used if the server wishes to close the connection. A server may wish to do this because the client was idle for too long or there were too many failed authentication attempts. This response can be issued at any time and should be immediately followed by a server hang-up of the connection. If a server has an inactivity timeout resulting in client autologout, it MUST be no less than 30 minutes after successful authentication. The inactivity timeout MAY be less before authentication.

1.3. Response Codes

An OK, NO, or BYE response from the server MAY contain a response code to describe the event in a more detailed machine-parsable fashion. A response code consists of data inside parentheses in the form of an atom, possibly followed by a space and arguments.

Response codes are defined when there is a specific action that a client can take based upon the additional information. In order to support future extension, the response code is represented as a slash-separated (Solidus, %x2F) hierarchy with each level of hierarchy representing increasing detail about the error. Response codes MUST NOT start with the Solidus character. Clients MUST tolerate additional hierarchical response code detail that they don't understand. For example, if the client supports the "QUOTA" response code, but doesn't understand the "QUOTA/MAXSCRIPTS" response code, it should treat "QUOTA/MAXSCRIPTS" as "QUOTA".

Client implementations MUST tolerate (ignore) response codes that they do not recognize.

The currently defined response codes are the following:

AUTH-TOO-WEAK

This response code is returned in the NO or BYE response from an AUTHENTICATE command. It indicates that site security policy forbids the use of the requested mechanism for the specified authentication identity.

ENCRYPT-NEEDED

This response code is returned in the NO or BYE response from an AUTHENTICATE command. It indicates that site security policy requires the use of a strong encryption mechanism for the specified authentication identity and mechanism.

QUOTA

If this response code is returned in the NO/BYE response, it means that the command would have placed the user above the site-defined quota constraints. If this response code is returned in the OK response, it can mean that the user's storage is near its quota, or it can mean that the account exceeded its quota but that the condition is being allowed by the server (the server supports so-called soft quotas). The QUOTA response code has two more detailed variants: "QUOTA/MAXSCRIPTS" (the maximum number of per-user scripts) and "QUOTA/MAXSIZE" (the maximum script size).

REFERRAL

This response code may be returned with a BYE result from any command, and includes a mandatory parameter that indicates what server to access to manage this user's Sieve scripts. The server will be specified by a Sieve URL (see Section 3). The scriptname

portion of the URL MUST NOT be specified. The client should authenticate to the specified server and use it for all further commands in the current session.

SASL

This response code can occur in the OK response to a successful AUTHENTICATE command and includes the optional final server response data from the server as specified by [SASL].

TRANSITION-NEEDED

This response code occurs in a NO response of an AUTHENTICATE command. It indicates that the user name is valid, but the entry in the authentication database needs to be updated in order to permit authentication with the specified mechanism. This is typically done by establishing a secure channel using TLS, verifying server identity as specified in Section 2.2.1, and finally authenticating once using the [PLAIN] authentication mechanism. The selected mechanism SHOULD then work for authentications in subsequent sessions.

This condition can happen if a user has an entry in a system authentication database such as Unix /etc/passwd, but does not have credentials suitable for use by the specified mechanism.

TRYLATER

A command failed due to a temporary server failure. The client MAY continue using local information and try the command later. This response code only makes sense when returned in a NO/BYE response.

ACTIVE

A command failed because it is not allowed on the active script, for example, DELETESCRIPT on the active script. This response code only makes sense when returned in a NO/BYE response.

NONEXISTENT

A command failed because the referenced script name doesn’t exist. This response code only makes sense when returned in a NO/BYE response.

ALREADYEXISTS

A command failed because the referenced script name already exists. This response code only makes sense when returned in a NO/BYE response.

TAG

This response code name is followed by a string specified in the command. See Section 2.13 for a possible use case.

WARNINGS

This response code MAY be returned by the server in the OK response (but it might be returned with the NO/BYE response as well) and signals the client that even though the script is syntactically valid, it might contain errors not intended by the script writer. This response code is typically returned in response to PUTSCRIPT and/or CHECKSCRIPT commands. A client seeing such response code SHOULD present the returned warning text to the user.

1.4. Active Script

A user may have multiple Sieve scripts on the server, yet only one script may be used for filtering of incoming messages. This is the active script. Users may have zero or one active script and MUST use the SETACTIVE command described below for changing the active script or disabling Sieve processing. For example, users may have an everyday script they normally use and a special script they use when they go on vacation. Users can change which script is being used without having to download and upload a script stored somewhere else.

1.5. Quotas

Servers SHOULD impose quotas to prevent malicious users from overflowing available storage. If a command would place a user over a quota setting, servers that impose such quotas MUST reply with a NO response containing the QUOTA response code. Client implementations MUST be able to handle commands failing because of quota restrictions.

1.6. Script Names

A Sieve script name is a sequence of Unicode characters encoded in UTF-8 [UTF-8]. A script name MUST comply with Net-Unicode Definition (Section 2 of [NET-UNICODE]), with the additional restriction of prohibiting the following Unicode characters:

- 0000-001F; [CONTROL CHARACTERS]

- 007F; DELETE

- 0080-009F; [CONTROL CHARACTERS]

- o 2028; LINE SEPARATOR

- o 2029; PARAGRAPH SEPARATOR

Sieve script names MUST be at least one octet (and hence Unicode character) long. Zero octets script name has a special meaning (see Section 2.8). Servers MUST allow names of up to 128 Unicode characters in length (which can take up to 512 bytes when encoded in UTF-8, not counting the terminating NUL), and MAY allow longer names. A server that receives a script name longer than its internal limit MUST reject the corresponding operation, in particular it MUST NOT truncate the script name.

1.7. Capabilities

Server capabilities are sent automatically by the server upon a client connection, or after successful STARTTLS and AUTHENTICATE (which establishes a Simple Authentication and Security Layer (SASL)) commands. Capabilities may change immediately after a successfully completed STARTTLS command, and/or immediately after a successfully completed AUTHENTICATE command, and/or after a successfully completed UNAUTHENTICATE command (see Section 2.14.1). Capabilities MUST remain static at all other times.

Clients MAY request the capabilities at a later time by issuing the CAPABILITY command described later. The capabilities consist of a series of lines each with one or two strings. The first string is the name of the capability, which is case-insensitive. The second optional string is the value associated with that capability. Order of capabilities is arbitrary, but each capability name can appear at most once.

The following capabilities are defined in this document:

IMPLEMENTATION - Name of implementation and version. This capability MUST always be returned by the server.

SASL - List of SASL mechanisms supported by the server, each separated by a space. This list can be empty if and only if STARTTLS is also advertised. This means that the client must negotiate TLS encryption with STARTTLS first, at which point the SASL capability will list a non-empty list of SASL mechanisms.

SIEVE - List of space-separated Sieve extensions (as listed in Sieve "require" action [SIEVE]) supported by the Sieve engine. This capability MUST always be returned by the server.

STARTTLS - If TLS [TLS] is supported by this implementation. Before advertising this capability a server MUST verify to the best of its ability that TLS can be successfully negotiated by a client with common cipher suites. Specifically, a server should verify that a server certificate has been installed and that the TLS subsystem has successfully initialized. This capability SHOULD NOT be advertised once STARTTLS or AUTHENTICATE command completes successfully. Client and server implementations MUST implement the STARTTLS extension.

MAXREDIRECTS - Specifies the limit on the number of Sieve "redirect" actions a script can perform during a single evaluation. Note that this is different from the total number of "redirect" actions a script can contain. The value is a non-negative number represented as a ManageSieve string.

NOTIFY - A space-separated list of URI schema parts for supported notification methods. This capability MUST be specified if the Sieve implementation supports the "enotify" extension [NOTIFY].

LANGUAGE - The language (<Language-Tag> from [RFC5646]) currently used for human-readable error messages. If this capability is not returned, the "i-default" [RFC2277] language is assumed. Note that the current language MAY be per-user configurable (i.e., it MAY change after authentication).

OWNER - The canonical name of the logged-in user (SASL "authorization identity") encoded in UTF-8. This capability MUST NOT be returned in unauthenticated state and SHOULD be returned once the AUTHENTICATE command succeeds.

VERSION - This capability MUST be returned by servers compliant with this document or its successor. For servers compliant with this document, the capability value is the string "1.0". Lack of this capability means that the server predates this specification and thus doesn’t support the following commands: RENAMESCRIPT, CHECKSCRIPT, and NOOP.

Section 2.14 defines some additional ManageSieve extensions and their respective capabilities.

A server implementation MUST return SIEVE, IMPLEMENTATION, and VERSION capabilities.

A client implementation MUST ignore any listed capabilities that it does not understand.

Example:

```
S: "IMPlemENTATION" "Example1 ManageSieved v001"
S: "SASl" "DIGEST-MD5 GSSAPI"
S: "SIeVE" "fileinto vacation"
S: "StaRTTLS"
S: "NOTIFY" "xmpp mailto"
S: "MAXREdIRECTS" "5"
S: "VERSION" "1.0"
S: OK
```

After successful authentication, this might look like this:

Example:

```
S: "IMPlemENTATION" "Example1 ManageSieved v001"
S: "SASl" "DIGEST-MD5 GSSAPI"
S: "SIeVE" "fileinto vacation"
S: "NOTIFY" "xmpp mailto"
S: "OWNER" "alexey@example.com"
S: "MAXREdIRECTS" "5"
S: "VERSION" "1.0"
S: OK
```

1.8. Transport

The ManageSieve protocol assumes a reliable data stream such as that provided by TCP. When TCP is used, a ManageSieve server typically listens on port 4190.

Before opening the TCP connection, the ManageSieve client first MUST resolve the Domain Name System (DNS) hostname associated with the receiving entity and determine the appropriate TCP port for communication with the receiving entity. The process is as follows:

1. Attempt to resolve the hostname using a [DNS-SRV] Service of "sieve" and a Proto of "tcp" for the target domain (e.g., "example.net"), resulting in resource records such as "_sieve._tcp.example.net.". The result of the SRV lookup, if successful, will be one or more combinations of a port and hostname; the ManageSieve client MUST resolve the returned hostnames to IPv4/IPv6 addresses according to returned SRV record weight. IP addresses from the first successfully resolved hostname (with the corresponding port number returned by SRV lookup) are used to connect to the server. If connection using one of the IP addresses fails, the next resolved IP address is

used to connect. If connection to all resolved IP addresses fails, then the resolution/connect is repeated for the next hostname returned by SRV lookup.

2. If the SRV lookup fails, the fallback SHOULD be a normal IPv4 or IPv6 address record resolution to determine the IP address, where the port used is the default ManageSieve port of 4190.

1.9. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [KEYWORDS].

In examples, "C:" and "S:" indicate lines sent by the client and server respectively. Line breaks that do not start a new "C:" or "S:" exist for editorial reasons.

Examples of authentication in this document are using DIGEST-MD5 [DIGEST-MD5] and GSSAPI [GSSAPI] SASL mechanisms.

2. Commands

This section and its subsections describe valid ManageSieve commands. Upon initial connection to the server, the client’s session is in non-authenticated state. Prior to successful authentication, only the AUTHENTICATE, CAPABILITY, STARTTLS, LOGOUT, and NOOP (see Section 2.13) commands are valid. ManageSieve extensions MAY define other commands that are valid in non-authenticated state. Servers MUST reject all other commands with a NO response. Clients may pipeline commands (send more than one command at a time without waiting for completion of the first command). However, a group of commands sent together MUST NOT have an AUTHENTICATE (*), a STARTTLS, or a HAVESPACE command anywhere but the last command in the list.

(*) - The only exception to this rule is when the AUTHENTICATE command contains an initial response for a SASL mechanism that allows clients to send data first, the mechanism is known to complete in one round trip, and the mechanism doesn’t negotiate a SASL security layer. Two examples of such SASL mechanisms are PLAIN [PLAIN] and EXTERNAL [SASL].

2.1. AUTHENTICATE Command

```
Arguments:  String - mechanism
            String - initial data (optional)
```

The AUTHENTICATE command indicates a SASL [SASL] authentication mechanism to the server. If the server supports the requested authentication mechanism, it performs an authentication protocol exchange to identify and authenticate the user. Optionally, it also negotiates a security layer for subsequent protocol interactions. If the requested authentication mechanism is not supported, the server rejects the AUTHENTICATE command by sending the NO response.

The authentication protocol exchange consists of a series of server challenges and client responses that are specific to the selected authentication mechanism. A server challenge consists of a string (quoted or literal) followed by a CRLF. The contents of the string is a base-64 encoding [BASE64] of the SASL data. A client response consists of a string (quoted or literal) with the base-64 encoding of the SASL data followed by a CRLF. If the client wishes to cancel the authentication exchange, it issues a string containing a single "*". If the server receives such a response, it MUST reject the AUTHENTICATE command by sending a NO reply.

Note that an empty challenge/response is sent as an empty string. If the mechanism dictates that the final response is sent by the server, this data MAY be placed within the data portion of the SASL response code to save a round trip.

The optional initial-response argument to the AUTHENTICATE command is used to save a round trip when using authentication mechanisms that are defined to send no data in the initial challenge. When the initial-response argument is used with such a mechanism, the initial empty challenge is not sent to the client and the server uses the data in the initial-response argument as if it were sent in response to the empty challenge. If the initial-response argument to the AUTHENTICATE command is used with a mechanism that sends data in the initial challenge, the server MUST reject the AUTHENTICATE command by sending the NO response.

The service name specified by this protocol’s profile of SASL is "sieve".

Reauthentication is not supported by ManageSieve protocol’s profile of SASL. That is, after a successfully completed AUTHENTICATE command, no more AUTHENTICATE commands may be issued in the same session. After a successful AUTHENTICATE command completes, a server MUST reject any further AUTHENTICATE commands with a NO reply.

However, note that a server may implement the UNAUTHENTICATE extension described in Section 2.14.1.

If a security layer is negotiated through the SASL authentication exchange, it takes effect immediately following the CRLF that concludes the successful authentication exchange for the client, and the CRLF of the OK response for the server.

When a security layer takes effect, the ManageSieve protocol is reset to the initial state (the state in ManageSieve after a client has connected to the server). The server MUST discard any knowledge obtained from the client that was not obtained from the SASL (or TLS) negotiation itself. Likewise, the client MUST discard any knowledge obtained from the server, such as the list of ManageSieve extensions, that was not obtained from the SASL (and/or TLS) negotiation itself. (Note that a client MAY compare the advertised SASL mechanisms before and after authentication in order to detect an active down-negotiation attack. See below.)

Once a SASL security layer is established, the server MUST re-issue the capability results, followed by an OK response. This is necessary to protect against man-in-the-middle attacks that alter the capabilities list prior to SASL negotiation. The capability results MUST include all SASL mechanisms the server was capable of negotiating with that client. This is done in order to allow the client to detect an active down-negotiation attack. If a user-oriented client detects such a down-negotiation attack, it SHOULD either notify the user (it MAY give the user the opportunity to continue with the ManageSieve session in this case) or close the transport connection and indicate that a down-negotiation attack might be in progress. If an automated client detects a down-negotiation attack, it SHOULD return or log an error indicating that a possible attack might be in progress and/or SHOULD close the transport connection.

When both [TLS] and SASL security layers are in effect, the TLS encoding MUST be applied (when sending data) after the SASL encoding.

Server implementations SHOULD support SASL proxy authentication so that an administrator can administer a user’s scripts. Proxy authentication is when a user authenticates as herself/himself but requests the server to act (authorize) as another user.

The authorization identity generated by this [SASL] exchange is a "simple username" (in the sense defined in [SASLprep]), and both client and server MUST use the [SASLprep] profile of the [StringPrep] algorithm to prepare these names for transmission or comparison. If preparation of the authorization identity fails or results in an

empty string (unless it was transmitted as the empty string), the server MUST fail the authentication.

If an AUTHENTICATE command fails with a NO response, the client MAY try another authentication mechanism by issuing another AUTHENTICATE command. In other words, the client may request authentication types in decreasing order of preference.

Note that a failed (NO) response to the AUTHENTICATE command may contain one of the following response codes: AUTH-TOO-WEAK, ENCRYPT-NEEDED, or TRANSITION-NEEDED. See Section 1.3 for detailed description of the relevant conditions.

To ensure interoperability, both client and server implementations of the ManageSieve protocol MUST implement the SCRAM-SHA-1 [SCRAM] SASL mechanism, as well as [PLAIN] over [TLS].

Note: use of PLAIN over TLS reflects current use of PLAIN over TLS in other email-related protocols; however, a longer-term goal is to migrate email-related protocols from using PLAIN over TLS to SCRAM-SHA-1 mechanism.

Examples (Note that long lines are folded for readability and are not part of protocol exchange):

```
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "SASL" "DIGEST-MD5 GSSAPI"
S: "SIEVE" "fileinto vacation"
S: "STARTTLS"
S: "VERSION" "1.0"
S: OK
C: Authenticate "DIGEST-MD5"
S: "cmVhbG09ImVsd29vZC5pbm5vc29mdC5leGFtcGxlLmNvbSIsbm9uY2U9Ik
   9BNk1HOXRFUUdtMmhoIixxb3A9ImF1dGgiLGFsZ29yaXRobT1tZDUtc2Vz
   cyxjaGFyc2V0PXV0Zi04"
C: "Y2hhcnNldD11dGYtOCx1c2VybmFtZT0iY2hyaXMiLHJlYWxtPSJlbHdvb2
   QuaW5ub3NvZnQuZXhhbXBsZS5jb20iLG5vbmNlPSJPQTZNRzl0RVFHbTJo
   aCIsbmM9MDAwMDAwMDEsY25vbmNlPSJPQTZNSFhoNlZxVHJSayIsZGlnZX
   N0LXVyaT0ic2lldmUvZWx3b29kLmlubm9zb2Z0LmV4YW1wbGUuY29tIixy
   ZXNwb25zZT1kMzg4ZGFkOTBkNGJiZDc2MGExNTIzMjFmMjE0M2FmNyxxb3
   A9YXV0aA=="
S: OK (SASL "cnNwYXV0aD1lYTQwZjYwMzM1YzQyN2I1NTI3Yjg0ZGJhYmNkZ
   mZmZA==")
```

A slightly different variant of the same authentication exchange is:

```
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "SASL" "DIGEST-MD5 GSSAPI"
S: "SIEVE" "fileinto vacation"
S: "VERSION" "1.0"
S: "STARTTLS"
S: OK
C: Authenticate "DIGEST-MD5"
S: {136}
S: cmVhbG09ImVsd29vZC5pbm5vc29mdC5leGFtcGxlLmNvbSIsbm9uY2U9Ik
   9BNk1HOXRFUUdtMmhoIixxb3A9ImF1dGgiLGFsZ29yaXRobT1tZDUtc2Vz
   cyxjaGFyc2V0PXV0Zi04
C: {300+}
C: Y2hhcnNldD11dGYtOCx1c2VybmFtZT0iY2hyaXMiLHJlYWxtPSJlbHdvb2
   QuaW5ub3NvZnQuZXhhbXBsZS5jb20iLG5vbmNlPSJPQTZNRzl0RVFHbTJo
   aCIsbmM9MDAwMDAwMDEsY25vbmNlPSJPQTZNSFhoNlZxVHJSayIsZGlnZX
   N0LXVyaT0ic2lldmUvZWx3b29kLmlubm9zb2Z0LmV4YW1wbGUuY29tIixy
   ZXNwb25zZT1kMzg4ZGFkOTBkNGJiZDc2MGExNTIzMjFmMjE0M2FmNyxxb3
   A9YXV0aA==
S: {56}
S: cnNwYXV0aD1lYTQwZjYwMzM1YzQyN2I1NTI3Yjg0ZGJhYmNkZmZmZA==
C: ""
S: OK
```

Another example demonstrating use of SASL PLAIN mechanism under TLS follows. This example also demonstrate use of SASL "initial response" (the second parameter to the Authenticate command):

```
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "VERSION" "1.0"
S: "SASL" ""
S: "SIEVE" "fileinto vacation"
S: "STARTTLS"
S: OK
C: STARTTLS
S: OK
<TLS negotiation, further commands are under TLS layer>
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "VERSION" "1.0"
S: "SASL" "PLAIN"
S: "SIEVE" "fileinto vacation"
S: OK
C: Authenticate "PLAIN" "QJIrweAPyo6Q1T9xu"
S: NO
C: Authenticate "PLAIN" "QJIrweAPyo6Q1T9xz"
S: NO
C: Authenticate "PLAIN" "QJIrweAPyo6Q1T9xy"
S: BYE "Too many failed authentication attempts"
<Server closes connection>
```

The following example demonstrates use of SASL "initial response". It also demonstrates that an empty response can be sent as a literal and that negotiating a SASL security layer results in the server re-issuing server capabilities:

```
C: AUTHENTICATE "GSSAPI" {1488+}
C: YIIE[...1480 octets here ...]dA==
S: {208}
S: YIGZBgkqhkiG9xIBAgICAG+BiTCBhqADAgEFoQMCAQ+iejB4oAMCARKic
   [...114 octets here ...]
   /yzpAy9p+Y0LanLskOTvMc0MnjgAa4YEr3eJ6
C: {0+}
C:
S: {44}
S: BQQF/wAMAAwAAAAAYRGFAo6W0vIHti8i1UXODgEAEAA=
C: {44+}
C: BQQE/wAMAAwAAAAAIsT1iv9UkZApw471iXt6cwEAAAE=
S: OK
<Further commands/responses are under SASL security layer>
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "VERSION" "1.0"
S: "SASL" "PLAIN DIGEST-MD5 GSSAPI"
S: "SIEVE" "fileinto vacation"
S: "LANGUAGE" "ru"
S: "MAXREDIRECTS" "3"
S: ok
```

2.1.1. Use of SASL PLAIN Mechanism over TLS

This section is normative for ManageSieve client implementations that support SASL [PLAIN] over [TLS].

If a ManageSieve client is willing to use SASL PLAIN over TLS to authenticate to the ManageSieve server, the client MUST verify the server identity (see Section 2.2.1). If the server identity can’t be verified (e.g., the server has not provided any certificate, or if the certificate verification fails), the client MUST NOT attempt to authenticate using the SASL PLAIN mechanism.

2.2. STARTTLS Command

Support for STARTTLS command in servers is optional. Its availability is advertised with "STARTTLS" capability as described in Section 1.7.

The STARTTLS command requests commencement of a TLS [TLS] negotiation. The negotiation begins immediately after the CRLF in the OK response. After a client issues a STARTTLS command, it MUST

NOT issue further commands until a server response is seen and the TLS negotiation is complete.

The STARTTLS command is only valid in non-authenticated state. The server remains in non-authenticated state, even if client credentials are supplied during the TLS negotiation. The SASL [SASL] EXTERNAL mechanism MAY be used to authenticate once TLS client credentials are successfully exchanged, but servers supporting the STARTTLS command are not required to support the EXTERNAL mechanism.

After the TLS layer is established, the server MUST re-issue the capability results, followed by an OK response. This is necessary to protect against man-in-the-middle attacks that alter the capabilities list prior to STARTTLS. This capability result MUST NOT include the STARTTLS capability.

The client MUST discard cached capability information and replace it with the new information. The server MAY advertise different capabilities after STARTTLS.

Example:

```
C: StartTls
S: oK
<TLS negotiation, further commands are under TLS layer>
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "SASL" "PLAIN DIGEST-MD5 GSSAPI"
S: "SIEVE" "fileinto vacation"
S: "VERSION" "1.0"
S: "LANGUAGE" "fr"
S: ok
```

2.2.1. Server Identity Check

During the TLS negotiation, the ManageSieve client MUST check its understanding of the server hostname/IP address against the server’s identity as presented in the server Certificate message, in order to prevent man-in-the-middle attacks. In this section, the client’s understanding of the server’s identity is called the "reference identity".

Checking is performed according to the following rules:

- o If the reference identity is a hostname:

  1. If a subjectAltName extension of the SRVName [X509-SRV], dNSName [X509] (in that order of preference) type is present in the server’s certificate, then it SHOULD be used as the

source of the server's identity. Matching is performed as described in Section 2.2.1.1, with the exception that no wildcard matching is allowed for SRVName type. If the certificate contains multiple names (e.g., more than one dNSName field), then a match with any one of the fields is considered acceptable.

2. The client MAY use other types of subjectAltName for performing comparison.

3. The server's identity MAY also be verified by comparing the reference identity to the Common Name (CN) [RFC4519] value in the leaf Relative Distinguished Name (RDN) of the subjectName field of the server's certificate. This comparison is performed using the rules for comparison of DNS names in Section 2.2.1.1, below. Although the use of the Common Name value is existing practice, it is deprecated, and Certification Authorities are encouraged to provide subjectAltName values instead. Note that the TLS implementation may represent DNs in certificates according to X.500 or other conventions. For example, some X.500 implementations order the RDNs in a DN using a left-to-right (most significant to least significant) convention instead of LDAP's right-to-left convention.

o When the reference identity is an IP address, the iPAddress subjectAltName SHOULD be used by the client for comparison. The comparison is performed as described in Section 2.2.1.2.

If the server identity check fails, user-oriented clients SHOULD either notify the user (clients MAY give the user the opportunity to continue with the ManageSieve session in this case) or close the transport connection and indicate that the server's identity is suspect. Automated clients SHOULD return or log an error indicating that the server's identity is suspect and/or SHOULD close the transport connection. Automated clients MAY provide a configuration setting that disables this check, but MUST provide a setting that enables it.

Beyond the server identity check described in this section, clients should be prepared to do further checking to ensure that the server is authorized to provide the service it is requested to provide. The client may need to make use of local policy information in making this determination.

2.2.1.1. Comparison of DNS Names

If the reference identity is an internationalized domain name, conforming implementations MUST convert it to the ASCII Compatible Encoding (ACE) format as specified in Section 4 of RFC 3490 [RFC3490] before comparison with subjectAltName values of type dNSName. Specifically, conforming implementations MUST perform the conversion operation specified in Section 4 of [RFC3490] as follows:

- in step 1, the domain name SHALL be considered a "stored string";
- in step 3, set the flag called "UseSTD3ASCIIRules";
- in step 4, process each label with the "ToASCII" operation; and
- in step 5, change all label separators to U+002E (full stop).

After performing the "to-ASCII" conversion, the DNS labels and names MUST be compared for equality according to the rules specified in Section 3 of [RFC3490]; i.e., once all label separators are replaced with U+002E (dot) they are compared in the case-insensitive manner.

The '*' (ASCII 42) wildcard character is allowed in subjectAltName values of type dNSName, and then only as the left-most (least significant) DNS label in that value. This wildcard matches any left-most DNS label in the server name. That is, the subject *.example.com matches the server names a.example.com and b.example.com, but does not match example.com or a.b.example.com.

2.2.1.2. Comparison of IP Addresses

When the reference identity is an IP address, the identity MUST be converted to the "network byte order" octet string representation [RFC791][RFC2460]. For IP Version 4, as specified in RFC 791, the octet string will contain exactly four octets. For IP Version 6, as specified in RFC 2460, the octet string will contain exactly sixteen octets. This octet string is then compared against subjectAltName values of type iPAddress. A match occurs if the reference identity octet string and value octet strings are identical.

2.2.1.3. Comparison of Other subjectName Types

Client implementations MAY support matching against subjectAltName values of other types as described in other documents.

2.3. LOGOUT Command

The client sends the LOGOUT command when it is finished with a connection and wishes to terminate it. The server MUST reply with an OK response. The server MUST ignore commands issued by the client after the LOGOUT command.

The client SHOULD wait for the OK response before closing the connection. This avoids the TCP connection going into the TIME_WAIT state on the server. In order to avoid going into the TIME_WAIT TCP state, the server MAY wait for a short while for the client to close the TCP connection first. Whether or not the server waits for the client to close the connection, it MUST then close the connection itself.

Example:

```
C: Logout
S: Ok
<connection is terminated>
```

2.4. CAPABILITY Command

The CAPABILITY command requests the server capabilities as described earlier in this document. It has no parameters.

Example:

```
C: CAPABILITY
S: "IMPLEMENTATION" "Example1 ManageSieved v001"
S: "VERSION" "1.0"
S: "SASL" "PLAIN SCRAM-SHA-1 GSSAPI"
S: "SIEVE" "fileinto vacation"
S: "STARTTLS"
S: OK
```

2.5. HAVESPACE Command

```
Arguments:  String - name
            Number - script size
```

The HAVESPACE command is used to query the server for available space. Clients specify the name they wish to save the script as and its size in octets. Both parameters can be used by the server to see if the script with the specified name and size is within a user’s quota(s). For example, the server MAY use the script name to check if a script would be replaced or a new one would be created. Servers respond with a NO if storing a script with that name and size would

fail or OK otherwise. Clients SHOULD issue this command before attempting to place a script on the server.

Note that the OK response from the HAVESPACE command does not constitute a guarantee of success as server disk space conditions could change between the client issuing the HAVESPACE and the client issuing the PUTSCRIPT commands. A QUOTA response code (see Section 1.3) remains a possible (albeit unlikely) response to a subsequent PUTSCRIPT with the same name and size.

Example:

```
C: HAVESPACE "myscript" 999999
S: NO (QUOTA/MAXSIZE) "Quota exceeded"

C: HAVESPACE "foobar" 435
S: OK
```

2.6. PUTSCRIPT Command

```
Arguments:  String - Script name
            String - Script content
```

The PUTSCRIPT command is used by the client to submit a Sieve script to the server.

If the script already exists, upon success the old script will be overwritten. The old script MUST NOT be overwritten if PUTSCRIPT fails in any way. A script of zero length SHOULD be disallowed.

This command places the script on the server. It does not affect whether the script is processed on incoming mail, unless it replaces the script that is already active. The SETACTIVE command is used to mark a script as active.

When submitting large scripts, clients SHOULD use the HAVESPACE command beforehand to query if the server is willing to accept a script of that size.

The server MUST check the submitted script for validity, which includes checking that the script complies with the Sieve grammar [SIEVE] and that all Sieve extensions mentioned in the script’s "require" statement(s) are supported by the Sieve interpreter. (Note that if the Sieve interpreter supports the Sieve "ihave" extension [I-HAVE], any unrecognized/unsupported extension mentioned in the "ihave" test MUST NOT cause the validation failure.) Other checks such as validating the supplied command arguments for each command MAY be performed. Essentially, the performed validation SHOULD be

the same as performed when compiling the script for execution. Implementations that use a binary representation to store compiled scripts can extend the validation to a full compilation, in order to avoid validating uploaded scripts multiple times.

If the script fails the validation, the server MUST reply with a NO response. Any script that fails the validity test MUST NOT be stored on the server. The message given with a NO response MUST be human readable and SHOULD contain a specific error message giving the line number of the first error. Implementors should strive to produce helpful error messages similar to those given by programming language compilers. Client implementations should note that this may be a multiline literal string with more than one error message separated by CRLFs. The human-readable message is in the language returned in the latest LANGUAGE capability (or in "i-default"; see Section 1.7), encoded in UTF-8 [UTF-8].

An OK response MAY contain the WARNINGS response code. In such a case the human-readable message that follows the OK response SHOULD contain a specific warning message (or messages) giving the line number(s) in the script that might contain errors not intended by the script writer. The human-readable message is in the language returned in the latest LANGUAGE capability (or in "i-default"; see Section 1.7), encoded in UTF-8 [UTF-8]. A client seeing such a response code SHOULD present the message to the user.

Examples:

```
C: Putscript "foo" {31+}
C: #comment
C: InvalidSieveCommand
C:
S: NO "line 2: Syntax error"

C: Putscript "mysievescript" {110+}
C: require ["fileinto"];
C:
C: if envelope :contains "to" "tmartin+sent" {
C:   fileinto "INBOX.sent";
C: }
S: OK

C: Putscript "myforwards" {190+}
C: redirect "111@example.net";
C:
C: if size :under 10k {
C:     redirect "mobile@cell.example.com";
C: }
C:
C: if envelope :contains "to" "tmartin+lists" {
C:     redirect "lists@groups.example.com";
C: }
S: OK (WARNINGS) "line 8: server redirect action
        limit is 2, this redirect might be ignored"
```

2.7. LISTSCRIPTS Command

This command lists the scripts the user has on the server. Upon success, a list of CRLF-separated script names (each represented as a quoted or literal string) is returned followed by an OK response. If there exists an active script, the atom ACTIVE is appended to the corresponding script name. The atom ACTIVE MUST NOT appear on more than one response line.

Example:

```
C: Listscripts
S: "summer_script"
S: "vacation_script"
S: {13}
S: clever"script
S: "main_script" ACTIVE
S: OK

C: listscripts
S: "summer_script"
S: "main_script" active
S: OK
```

2.8. SETACTIVE Command

Arguments: String - script name

This command sets a script active. If the script name is the empty string (i.e., ""), then any active script is disabled. Disabling an active script when there is no script active is not an error and MUST result in an OK reply.

If the script does not exist on the server, then the server MUST reply with a NO response. Such a reply SHOULD contain the NONEXISTENT response code.

Examples:

```
C: Setactive "vacationscript"
S: Ok

C: Setactive ""
S: Ok

C: Setactive "baz"
S: No (NONEXISTENT) "There is no script by that name"

C: Setactive "baz"
S: No (NONEXISTENT) {31}
S: There is no script by that name
```

2.9. GETSCRIPT Command

Arguments: String - script name

This command gets the contents of the specified script. If the script does not exist, the server MUST reply with a NO response. Such a reply SHOULD contain the NONEXISTENT response code.

Upon success, a string with the contents of the script is returned followed by an OK response.

Example:

```
C: Getscript "myscript"
S: {54}
S: #this is my wonderful script
S: reject "I reject all";
S:
S: OK
```

2.10. DELETESCRIPT Command

Arguments: String - script name

This command is used to delete a user’s Sieve script. Servers MUST reply with a NO response if the script does not exist. Such responses SHOULD include the NONEXISTENT response code.

The server MUST NOT allow the client to delete an active script, so the server MUST reply with a NO response if attempted. Such a response SHOULD contain the ACTIVE response code. If a client wishes to delete an active script, it should use the SETACTIVE command to disable the script first.

Example:

```
C: Deletescript "foo"
S: Ok

C: Deletescript "baz"
S: No (ACTIVE) "You may not delete an active script"
```

2.11. RENAMESCRIPT Command

```
Arguments:  String - Old Script name
            String - New Script name
```

This command is used to rename a user's Sieve script. Servers MUST reply with a NO response if the old script does not exist (in which case the NONEXISTENT response code SHOULD be included), or a script with the new name already exists (in which case the ALREADYEXISTS response code SHOULD be included). Renaming the active script is allowed; the renamed script remains active.

Example:

```
C: Renamescript "foo" "bar"
S: Ok

C: Renamescript "baz" "bar"
S: No "bar already exists"
```

If the server doesn't support the RENAMESCRIPT command, the client can emulate it by performing the following steps:

1. List available scripts with LISTSCRIPTS. If the script with the new script name exists, then the client should ask the user whether to abort the operation, to replace the script (by issuing the DELETESCRIPT <newname> after that), or to choose a different name.

2. Download the old script with GETSCRIPT <oldname>.

3. Upload the old script with the new name: PUTSCRIPT <newname>.

4. If the old script was active (as reported by LISTSCRIPTS in step 1), then make the new script active: SETACTIVE <newname>.

5. Delete the old script: DELETESCRIPT <oldname>.

Note that these steps don't describe how to handle various other error conditions (for example, NO response containing QUOTA response code in step 3). Error handling is left as an exercise for the reader.

2.12. CHECKSCRIPT Command

Arguments: String - Script content

The CHECKSCRIPT command is used by the client to verify Sieve script validity without storing the script on the server.

The server MUST check the submitted script for syntactic validity, which includes checking that all Sieve extensions mentioned in Sieve script "require" statement(s) are supported by the Sieve interpreter. (Note that if the Sieve interpreter supports the Sieve "ihave" extension [I-HAVE], any unrecognized/unsupported extension mentioned in the "ihave" test MUST NOT cause the syntactic validation failure.) If the script fails this test, the server MUST reply with a NO response. The message given with a NO response MUST be human readable and SHOULD contain a specific error message giving the line number of the first error. Implementors should strive to produce helpful error messages similar to those given by programming language compilers. Client implementations should note that this may be a multiline literal string with more than one error message separated by CRLFs. The human-readable message is in the language returned in the latest LANGUAGE capability (or in "i-default"; see Section 1.7), encoded in UTF-8 [UTF-8].

Examples:

```
C: CheckScript {31+}
C: #comment
C: InvalidSieveCommand
C:
S: NO "line 2: Syntax error"
```

A ManageSieve server supporting this command MUST NOT check if the script will put the current user over its quota limit.

An OK response MAY contain the WARNINGS response code. In such a case, the human-readable message that follows the OK response SHOULD contain a specific warning message (or messages) giving the line number(s) in the script that might contain errors not intended by the script writer. The human-readable message is in the language returned in the latest LANGUAGE capability (or in "i-default"; see Section 1.7), encoded in UTF-8 [UTF-8]. A client seeing such a response code SHOULD present the message to the user.

2.13. NOOP Command

Arguments: String - tag to echo back (optional)

The NOOP command does nothing, beyond returning a response to the client. It may be used by clients for protocol re-synchronization or to reset any inactivity auto-logout timer on the server.

The response to the NOOP command is always OK, followed by the TAG response code together with the supplied string. If no string was supplied in the NOOP command, the TAG response code MUST NOT be included.

Examples:

```
C: NOOP
S: OK "NOOP completed"

C: NOOP "STARTTLS-SYNC-42"
S: OK (TAG {16}
S: STARTTLS-SYNC-42) "Done"
```

2.14. Recommended Extensions

The UNAUTHENTICATE extension (advertised as the "UNAUTHENTICATE" capability with no parameters) defines a new UNAUTHENTICATE command, which allows a client to return the server to non-authenticated state. Support for this extension is RECOMMENDED.

2.14.1. UNAUTHENTICATE Command

The UNAUTHENTICATE command returns the server to the non-authenticated state. It doesn’t affect any previously established TLS [TLS] or SASL (Section 2.1) security layer.

The UNAUTHENTICATE command is only valid in authenticated state. If issued in a wrong state, the server MUST reject it with a NO response.

The UNAUTHENTICATE command has no parameters.

When issued in the authenticated state, the UNAUTHENTICATE command MUST NOT fail (i.e., it must never return anything other than OK or BYE).

3. Sieve URL Scheme

URI scheme name: sieve

Status: permanent

URI scheme syntax: Described using ABNF [ABNF]. Some ABNF productions not defined below are from [URI-GEN].

```
sieveurl = sieveurl-server / sieveurl-list-scripts /
           sieveurl-script

sieveurl-server = "sieve://" authority

sieveurl-list-scripts = "sieve://" authority ["/"]

sieveurl-script = "sieve://" authority "/"
                  [owner "/"] scriptname

authority = <defined in [URI-GEN]>

owner         = *ochar
                ;; %-encoded version of [SASL] authorization
                ;; identity (script owner) or "userid".
                ;;
                ;; Empty owner is used to reference
                ;; global scripts.
                ;;
                ;; Note that ASCII characters such as " ", ";",
                ;; "&", "=", "/" and "?" must be %-encoded
                ;; as per rule specified in [URI-GEN].

scriptname    = 1*ochar
                ;; %-encoded version of UTF-8 representation
                ;; of the script name.
                ;; Note that ASCII characters such as " ", ";",
                ;; "&", "=", "/" and "?" must be %-encoded
                ;; as per rule specified in [URI-GEN].

ochar         = unreserved / pct-encoded / sub-delims-sh /
                ":" / "@"
                ;; Same as [URI-GEN] 'pchar',
                ;; but without ";", "&" and "=".

unreserved = <defined in [URI-GEN]>

pct-encoded = <defined in [URI-GEN]>
```

```
sub-delims-sh = "!" / "$" / "'" / "(" / ")" /
                "*" / "+" / ","
                ;; Same as [URI-GEN] sub-delims,
                ;; but without ";", "&" and "=".
```

URI scheme semantics:

A Sieve URL identifies a Sieve server or a Sieve script on a Sieve server. The latter form is associated with the application/sieve MIME type defined in [SIEVE]. There is no MIME type associated with the former form of Sieve URI.

The server form is used in the REFERRAL response code (see Section 1.3) in order to designate another server where the client should perform its operations.

The script form allows to retrieve (GETSCRIPT), update (PUTSCRIPT), delete (DELETESCRIPT), or activate (SETACTIVE) the named script; however, the most typical action would be to retrieve the script. If the script name is empty (omitted), the URI requests that the client lists available scripts using the LISTSCRIPTS command.

Encoding considerations:

The script name and/or the owner, if present, is in UTF-8. Non--US-ASCII UTF-8 octets MUST be percent-encoded as described in [URI-GEN]. US-ASCII characters such as " " (space), ";", "&", "=", "/" and "?" MUST be %-encoded as described in [URI-GEN]. Note that "&" and "?" are in this list in order to allow for future extensions.

Note that the empty owner (e.g., sieve://example.com//script) is different from the missing owner (e.g., sieve://example.com/script) and is reserved for referencing global scripts.

The user name (in the "authority" part), if present, is in UTF-8. Non-US-ASCII UTF-8 octets MUST be percent-encoded as described in [URI-GEN].

Applications/protocols that use this URI scheme name:
ManageSieve [RFC5804] clients and servers. Clients that can store user preferences in protocols such as [LDAP] or [ACAP].

Interoperability considerations: None.

Security considerations:
The <scriptname> part of a ManageSieve URL might potentially disclose some confidential information about the author of the script or, depending on a ManageSieve implementation, about configuration of the mail system. The latter might be used to prepare for a more complex attack on the mail system.

Clients resolving ManageSieve URLs that wish to achieve data confidentiality and/or integrity SHOULD use the STARTTLS command (if supported by the server) before starting authentication, or use a SASL mechanism, such as GSSAPI, that provides a confidentiality security layer.

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References: This document and RFC 5228 [SIEVE].

4. Formal Syntax

The following syntax specification uses the Augmented Backus-Naur Form (BNF) notation as specified in [ABNF]. This uses the ABNF core rules as specified in Appendix A of the ABNF specification [ABNF]. "UTF8-2", "UTF8-3", and "UTF8-4" non-terminal are defined in [UTF-8].

Except as noted otherwise, all alphabetic characters are case-insensitive. The use of upper- or lowercase characters to define token strings is for editorial clarity only. Implementations MUST accept these strings in a case-insensitive fashion.

```
SAFE-CHAR             = %x01-09 / %x0B-0C / %x0E-21 / %x23-5B /
                        %x5D-7F
                        ;; any TEXT-CHAR except QUOTED-SPECIALS

QUOTED-CHAR           = SAFE-UTF8-CHAR / "\" QUOTED-SPECIALS

QUOTED-SPECIALS       = DQUOTE / "\"

SAFE-UTF8-CHAR        = SAFE-CHAR / UTF8-2 / UTF8-3 / UTF8-4
                        ;; <UTF8-2>, <UTF8-3>, and <UTF8-4>
                        ;; are defined in [UTF-8].

ATOM-CHAR             = "!" / %x23-27 / %x2A-5B / %x5D-7A / %x7C-7E
                        ;; Any CHAR except ATOM-SPECIALS

ATOM-SPECIALS         = "(" / ")" / "{" / SP / CTL / QUOTED-SPECIALS
```

```
NZDIGIT                = %x31-39
                         ;; 1-9

atom                   = 1*1024ATOM-CHAR

iana-token             = atom
                         ;; MUST be registered with IANA

auth-type              = DQUOTE auth-type-name DQUOTE

auth-type-name         = iana-token
                         ;; as defined in SASL [SASL]

command                = (command-any / command-auth /
                          command-nonauth) CRLF
                         ;; Modal based on state

command-any            = command-capability / command-logout /
                         command-noop
                         ;; Valid in all states

command-auth           = command-getscript / command-setactive /
                         command-listscripts / command-deletescript /
                         command-putscript / command-checkscript /
                         command-havespace /
                         command-renamescript /
                         command-unauthenticate
                         ;; Valid only in Authenticated state

command-nonauth        = command-authenticate / command-starttls
                         ;; Valid only when in Non-Authenticated
                         ;; state

command-authenticate   = "AUTHENTICATE" SP auth-type [SP string]
                         *(CRLF string)

command-capability     = "CAPABILITY"

command-deletescript   = "DELETESCRIPT" SP sieve-name

command-getscript      = "GETSCRIPT" SP sieve-name

command-havespace      = "HAVESPACE" SP sieve-name SP number

command-listscripts    = "LISTSCRIPTS"

command-noop           = "NOOP" [SP string]
```

```
command-logout        = "LOGOUT"

command-putscript     = "PUTSCRIPT" SP sieve-name SP sieve-script

command-checkscript   = "CHECKSCRIPT" SP sieve-script

sieve-script          = string

command-renamescript  = "RENAMESCRIPT" SP old-sieve-name SP
                        new-sieve-name

old-sieve-name        = sieve-name

new-sieve-name        = sieve-name

command-setactive     = "SETACTIVE" SP active-sieve-name

command-starttls      = "STARTTLS"

command-unauthenticate= "UNAUTHENTICATE"

extend-token          = atom
                        ;; MUST be defined by a Standards Track or
                        ;; IESG-approved experimental protocol
                        ;; extension

extension-data        = extension-item *(SP extension-item)

extension-item        = extend-token / string / number /
                        "(" [extension-data] ")"

literal-c2s           = "{" number "+}" CRLF *OCTET
                        ;; The number represents the number of
                        ;; octets.
                        ;; This type of literal can only be sent
                        ;; from the client to the server.

literal-s2c           = "{" number "}" CRLF *OCTET
                        ;; Almost identical to literal-c2s,
                        ;; but with no '+' character.
                        ;; The number represents the number of
                        ;; octets.
                        ;; This type of literal can only be sent
                        ;; from the server to the client.
```

```
number                = (NZDIGIT *DIGIT) / "0"
                        ;; A 32-bit unsigned number
                        ;; with no extra leading zeros.
                        ;; (0 <= n < 4,294,967,296)

number-str            = string
                        ;; <number> encoded as a <string>.

quoted                = DQUOTE *1024QUOTED-CHAR DQUOTE
                        ;; limited to 1024 octets between the <">s

resp-code             = "AUTH-TOO-WEAK" / "ENCRYPT-NEEDED" / "QUOTA"
                        ["/" ("MAXSCRIPTS" / "MAXSIZE")] /
                        resp-code-sasl /
                        resp-code-referral /
                        "TRANSITION-NEEDED" / "TRYLATER" /
                        "ACTIVE" / "NONEXISTENT" /
                        "ALREADYEXISTS" / "WARNINGS" /
                        "TAG" SP string /
                        resp-code-ext

resp-code-referral    = "REFERRAL" SP sieveurl

resp-code-sasl        = "SASL" SP string

resp-code-name        = iana-token
                        ;; The response code name is hierarchical,
                        ;; separated by '/'.
                        ;; The response code name MUST NOT start
                        ;; with '/'.

resp-code-ext         = resp-code-name [SP extension-data]
                        ;; unknown response codes MUST be tolerated
                        ;; by the client.

response              = response-authenticate /
                        response-logout /
                        response-getscript /
                        response-setactive /
                        response-listscripts /
                        response-deletescript /
                        response-putscript /
                        response-checkscript /
                        response-capability /
                        response-havespace /
                        response-starttls /
                        response-renamescript /
                        response-noop /
```

```
                            response-unauthenticate

    response-authenticate = *(string CRLF)
                            ((response-ok [response-capability]) /
                             response-nobye)
                            ;; <response-capability> is REQUIRED if a
                            ;; SASL security layer was negotiated and
                            ;; MUST be omitted otherwise.

    response-capability   = *(single-capability) response-oknobye

    single-capability     = capability-name [SP string] CRLF

    capability-name       = string

                            ;; Note that literal-s2c is allowed.

    initial-capabilities  = DQUOTE "IMPLEMENTATION" DQUOTE SP string /
                            DQUOTE "SASL" DQUOTE SP sasl-mechs /
                            DQUOTE "SIEVE" DQUOTE SP sieve-extensions /
                            DQUOTE "MAXREDIRECTS" DQUOTE SP number-str /
                            DQUOTE "NOTIFY" DQUOTE SP notify-mechs /
                            DQUOTE "STARTTLS" DQUOTE /
                            DQUOTE "LANGUAGE" DQUOTE SP language /
                            DQUOTE "VERSION" DQUOTE SP version /
                            DQUOTE "OWNER" DQUOTE SP string
                            ;; Each capability conforms to
                            ;; the syntax for single-capability.
                            ;; Also, note that the capability name
                            ;; can be returned as either literal-s2c
                            ;; or quoted, even though only "quoted"
                            ;; string is shown above.

    version = ( DQUOTE "1.0" DQUOTE ) / version-ext

    version-ext = DQUOTE ver-major "." ver-minor DQUOTE
                  ; Future versions specified in updates
                  ; to this document.  An increment to
                  ; the ver-major means a backward-incompatible
                  ; change to the protocol, e.g., "3.5" (ver-major "3")
                  ; is not backward-compatible with any "2.X" version.
                  ; Any version "Z.W" MUST be backward compatible
                  ; with any version "Z.Q", where Q < W.
                  ; For example, version "2.4" is backward compatible
                  ; with version "2.0", "2.1", "2.2", and "2.3".

    ver-major = number
```

```
    ver-minor = number

    sasl-mechs = string
                 ; Space-separated list of SASL mechanisms,
                 ; each SASL mechanism name complies with rules
                 ; specified in [SASL].
                 ; Can be empty.

    sieve-extensions = string
                 ; Space-separated list of supported SIEVE extensions.
                 ; Can be empty.

    language     = string
                 ; Contains <Language-Tag> from [RFC5646].


    notify-mechs = string
                 ; Space-separated list of URI schema parts
                 ; for supported notification [NOTIFY] methods.
                 ; MUST NOT be empty.

    response-deletescript = response-oknobye

    response-getscript    = (sieve-script CRLF response-ok) /
                            response-nobye

    response-havespace    = response-oknobye

    response-listscripts  = *(sieve-name [SP "ACTIVE"] CRLF)
                            response-oknobye
                            ;; ACTIVE may only occur with one sieve-name

    response-logout       = response-oknobye

    response-unauthenticate= response-oknobye
                             ;; "NO" response can only be returned when
                             ;; the command is issued in a wrong state
                             ;; or has a wrong number of parameters

    response-ok           = "OK" [SP "(" resp-code ")"]
                            [SP string] CRLF
                            ;; The string contains human-readable text
                            ;; encoded as UTF-8.

    response-nobye        = ("NO" / "BYE") [SP "(" resp-code ")"]
                            [SP string] CRLF
                            ;; The string contains human-readable text
                            ;; encoded as UTF-8.
```

```
response-oknobye      = response-ok / response-nobye

response-noop         = response-ok

response-putscript    = response-oknobye

response-checkscript  = response-oknobye

response-renamescript = response-oknobye

response-setactive    = response-oknobye

response-starttls     = (response-ok response-capability) /
                        response-nobye

sieve-name            = string
                        ;; See Section 1.6 for the full list of
                        ;; prohibited characters.
                        ;; Empty string is not allowed.

active-sieve-name     = string
                        ;; See Section 1.6 for the full list of
                        ;; prohibited characters.
                        ;; This is similar to <sieve-name>, but
                        ;; empty string is allowed and has a special
                        ;; meaning.

string                = quoted / literal-c2s / literal-s2c
                        ;; literal-c2s is only allowed when sent
                        ;; from the client to the server.
                        ;; literal-s2c is only allowed when sent
                        ;; from the server to the client.
                        ;; quoted is allowed in either direction.
```

5. Security Considerations

The AUTHENTICATE command uses SASL [SASL] to provide authentication and authorization services. Integrity and privacy services can be provided by [SASL] and/or [TLS]. When a SASL mechanism is used, the security considerations for that mechanism apply.

This protocol’s transactions are susceptible to passive observers or man-in-the-middle attacks that alter the data, unless the optional encryption and integrity services of the SASL (via the AUTHENTICATE command) and/or [TLS] (via the STARTTLS command) are enabled, or an external security mechanism is used for protection. It may be useful to allow configuration of both clients and servers to refuse to transfer sensitive information in the absence of strong encryption.

If an implementation supports SASL mechanisms that are vulnerable to passive eavesdropping attacks (such as [PLAIN]), then the implementation MUST support at least one configuration where these SASL mechanisms are not advertised or used without the presence of an external security layer such as [TLS].

Some response codes returned on failed AUTHENTICATE command may disclose whether or not the username is valid (e.g., TRANSITION-NEEDED), so server implementations SHOULD provide the ability to disable these features (or make them not conditional on a per-user basis) for sites concerned about such disclosure. In the case of ENCRYPT-NEEDED, if it is applied to all identities then no extra information is disclosed, but if it is applied on a per-user basis it can disclose information.

A compromised or malicious server can use the TRANSITION-NEEDED response code to force the client that is configured to use a mechanism that does not disclose the user’s password to the server (e.g., Kerberos), to send the bare password to the server. Clients SHOULD have the ability to disable the password transition feature, or disclose that risk to the user and offer the user an option of how to proceed.

6. IANA Considerations

IANA has reserved TCP port number 4190 for use with the ManageSieve protocol described in this document.

IANA has registered the "sieve" URI scheme defined in Section 3 of this document.

IANA has registered "sieve" in the "GSSAPI/Kerberos/SASL Service Names" registry.

IANA has created a new registry for ManageSieve capabilities. The registration template for ManageSieve capabilities is specified in Section 6.1. ManageSieve protocol capabilities MUST be specified in a Standards-Track or IESG-approved Experimental RFC.

IANA has created a new registry for ManageSieve response codes. The registration template for ManageSieve response codes is specified in Section 6.3. ManageSieve protocol response codes MUST be specified in a Standards-Track or IESG-approved Experimental RFC.

6.1. ManageSieve Capability Registration Template

```
To: iana@iana.org
Subject: ManageSieve Capability Registration

Please register the following ManageSieve capability:

Capability name:
Description:
Relevant publications:
Person & email address to contact for further information:
Author/Change controller:
```

6.2. Registration of Initial ManageSieve Capabilities

```
To: iana@iana.org
Subject: ManageSieve Capability Registration

Please register the following ManageSieve capabilities:

Capability name:  IMPLEMENTATION
Description:   Its value contains the name of the server
               implementation and its version.
Relevant publications:  this RFC, Section 1.7.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  SASL
Description:   Its value contains a space-separated list of SASL
               mechanisms supported by the server.
Relevant publications:  this RFC, Sections 1.7 and 2.1.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  SIEVE
Description:   Its value contains a space-separated list of supported
               SIEVE extensions.
Relevant publications:  this RFC, Section 1.7.  Also [SIEVE].
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Capability name:  STARTTLS
Description:   This capability is returned if the server supports TLS
               (STARTTLS command).
Relevant publications:  this RFC, Sections 1.7 and 2.2.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  NOTIFY
Description:   This capability is returned if the server supports the
               'enotify' [NOTIFY] Sieve extension.
Relevant publications:  this RFC, Section 1.7.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  MAXREDIRECTS
Description:   This capability returns the limit on the number of
               Sieve "redirect" actions a script can perform during a
               single evaluation.  The value is a non-negative number
               represented as a ManageSieve string.
Relevant publications:  this RFC, Section 1.7.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  LANGUAGE
Description:   The language (<Language-Tag> from [RFC5646]) currently
               used for human-readable error messages.
Relevant publications:  this RFC, Section 1.7.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Capability name:  OWNER
Description:   Its value contains the UTF-8-encoded name of the
               currently logged-in user ("authorization identity"
               according to RFC 4422).
Relevant publications:  this RFC, Section 1.7.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Capability name:  VERSION
Description:   This capability is returned if the server is compliant
               with RFC 5804; i.e., that it supports RENAMESCRIPT,
               CHECKSCRIPT, and NOOP commands.
Relevant publications:  this RFC, Sections 2.11, 2.12, and 2.13.
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

6.3. ManageSieve Response Code Registration Template

```
To: iana@iana.org
Subject: ManageSieve Response Code Registration

Please register the following ManageSieve response code:

   Response Code:
   Arguments (use ABNF to specify syntax, or the word NONE if none
   can be specified):
   Purpose:
   Published Specification(s):
   Person & email address to contact for further information:
   Author/Change controller:
```

6.4. Registration of Initial ManageSieve Response Codes

```
To: iana@iana.org
Subject: ManageSieve Response Code Registration

Please register the following ManageSieve response codes:

Response Code: AUTH-TOO-WEAK
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       This response code is returned in the NO response from
               an AUTHENTICATE command.  It indicates that site
               security policy forbids the use of the requested
               mechanism for the specified authentication identity.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Response Code: ENCRYPT-NEEDED
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       This response code is returned in the NO response from
               an AUTHENTICATE command.  It indicates that site
               security policy requires the use of a strong
               encryption mechanism for the specified authentication
               identity and mechanism.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: QUOTA
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       If this response code is returned in the NO/BYE
               response, it means that the command would have placed
               the user above the site-defined quota constraints.  If
               this response code is returned in the OK response, it
               can mean that the user is near its quota or that the
               user exceeded its quota, but the server supports soft
               quotas.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: QUOTA/MAXSCRIPTS
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       If this response code is returned in the NO/BYE
               response, it means that the command would have placed
               the user above the site-defined limit on the number of
               Sieve scripts.  If this response code is returned in
               the OK response, it can mean that the user is near its
               quota or that the user exceeded its quota, but the
               server supports soft quotas.  This response code is a
               more specific version of the QUOTA response code.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Response Code: QUOTA/MAXSIZE
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       If this response code is returned in the NO/BYE
               response, it means that the command would have placed
               the user above the site-defined maximum script size.
               If this response code is returned in the OK response,
               it can mean that the user is near its quota or that
               the user exceeded its quota, but the server supports
               soft quotas.  This response code is a more specific
               version of the QUOTA response code.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: REFERRAL
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  <sieveurl>
Purpose:       This response code may be returned with a BYE result
               from any command, and includes a mandatory parameter
               that indicates what server to access to manage this
               user's Sieve scripts.  The server will be specified by
               a Sieve URL (see Section 3).  The scriptname portion
               of the URL MUST NOT be specified.  The client should
               authenticate to the specified server and use it for
               all further commands in the current session.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: SASL
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  <string>
Purpose:       This response code can occur in the OK response to a
               successful AUTHENTICATE command and includes the
               optional final server response data from the server as
               specified by [SASL].
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Response Code: TRANSITION-NEEDED
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       This response code occurs in a NO response of an
               AUTHENTICATE command.  It indicates that the user name
               is valid, but the entry in the authentication database
               needs to be updated in order to permit authentication
               with the specified mechanism.  This is typically done
               by establishing a secure channel using TLS, followed
               by authenticating once using the [PLAIN]
               authentication mechanism.  The selected mechanism
               SHOULD then work for authentications in subsequent
               sessions.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: TRYLATER
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       A command failed due to a temporary server failure.
               The client MAY continue using local information and
               try the command later.  This response code only make
               sense when returned in a NO/BYE response.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: ACTIVE
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       A command failed because it is not allowed on the
               active script, for example, DELETESCRIPT on the active
               script.  This response code only makes sense when
               returned in a NO/BYE response.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

```
Response Code: NONEXISTENT
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       A command failed because the referenced script name
               doesn't exist.  This response code only makes sense
               when returned in a NO/BYE response.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: ALREADYEXISTS
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       A command failed because the referenced script name
               already exists.  This response code only makes sense
               when returned in a NO/BYE response.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: WARNINGS
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  NONE
Purpose:       This response code MAY be returned by the server in
               the OK response (but it might be returned with the NO/
               BYE response as well) and signals the client that even
               though the script is syntactically valid, it might
               contain errors not intended by the script writer.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.

Response Code: TAG
Arguments (use ABNF to specify syntax, or the word NONE if none can
be specified):  string
Purpose:       This response code name is followed by a string
               specified in the command that caused this response.
               It is typically used for client state synchronization.
Published Specification(s):  [RFC5804]
Person & email address to contact for further information:
               Alexey Melnikov <alexey.melnikov@isode.com>
Author/Change controller:  IESG.
```

7. Internationalization Considerations

The LANGUAGE capability (see Section 1.7) allows a client to discover the current language used in all human-readable responses that might be returned at the end of any OK/NO/BYE response. Human-readable text in OK responses typically doesn't need to be shown to the user, unless it is returned in response to a PUTSCRIPT or CHECKSCRIPT command that also contains the WARNINGS response code (Section 1.3). Human-readable text from NO/BYE responses is intended be shown to the user, unless the client can automatically handle failure of the command that caused such a response. Clients SHOULD use response codes (Section 1.3) for automatic error handling. Response codes MAY also be used by the client to present error messages in a language understood by the user, for example, if the LANGUAGE capability doesn't return a language understood by the user.

Note that the human-readable text from OK (WARNINGS) or NO/BYE responses for PUTSCRIPT/CHECKSCRIPT commands is intended for advanced users that understand Sieve language. Such advanced users are often sophisticated enough to be able to handle whatever language the server is using, even if it is not their preferred language, and will want to see error/warning text no matter what language the server puts it in.

A client that generates Sieve script automatically, for example, if the script is generated without user intervention or from a UI that presents an abstract list of conditions and corresponding actions, SHOULD NOT present warning/error messages to the user, because the user might not even be aware that the client is using Sieve underneath. However, if the client has a debugging mode, such warnings/errors SHOULD be available in the debugging mode.

Note that this document doesn't provide a way to modify the currently used language. It is expected that a future extension will address that.

8. Acknowledgements

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