HTTP URL Scheme extension for authentication
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Abstract

"HTTPS" scheme gives an HTTP client a hint that it must establish a TLS protected channel before invoking an operation described by the URL. This document defines extension to both "HTTP" and "HTTPS" schemes that tells the client to perform Simple Authentication and Security Layer [SASL] authentication according to SASL in HTTP 1.1 [HTTP-SASL] before invoking an operation described by the HTTP URL.
Table of Contents

1. Conventions Used in this Document .......................... 3
2. Introduction and Overview .................................... 4
3. HTTP User Name and Authentication Mechanism .................. 6
4. Security Considerations ........................................ 7
5. Acknowledgements ............................................... 8
6. Open Issues/ToDo ............................................... 9
   Normative References ......................................... 10
   Informative References ....................................... 11
   Author’s Address ............................................... 11
   Full Copyright Statement .................................... 12
1. Conventions Used in this Document

   The key words "MUST", "MUST NOT", "SHOULD", "SHOULD NOT", and "MAY" in this document are to be interpreted as defined in "Key words for use in RFCs to Indicate Requirement Levels" [KEYWORDS].
2. Introduction and Overview

Introduction of SASL in HTTP 1.1 [HTTP-SASL] emphasizes a security problem that is already present in HTTP. Imagine that a client is willing to send some data to the server (e.g. POST or PUT request) and the server requires that the data is being protected with TLS or SASL security layer. The server may refuse to perform the operation and return an appropriate error code (e.g. Unauthorized), however the data was already sent in the clear to the server. One can argue that this is a client problem: if the client has sent the data in the clear, than the user didn’t consider the data worth protecting. However, knowing what the client has sent to the server in a request might help an attacker to decipher the corresponding response from the server, even if it is encrypted. So, by protecting the request, it is possible to help protect the response.

"HTTPS" URL schema helps to avoid the issue by giving the client a hint that it must establish a TLS protected channel before invoking an operation described by the URL. This document defines extension to both "HTTP" and "HTTPS" schemes to achieve the same effect for SASL in HTTP. This section is replacing section 3.2.2 from HTTP 1.1 [RFC2616].

The "http"/"https" schemes are used to locate network resources via the HTTP protocol. The scheme "http" means the HTTP protocol alone, while "https" means the HTTP protocol over TLS/SSL. This section defines the scheme-specific syntax and semantics for http URLs.

```plaintext
http_URL         = http_scheme "//" iserver [ abs_path [ "?" query ]]
http_scheme      = "http:" | "https:"
iserver          = [iuserauth "@"] hostport
                  ;; See [BASIC-URL] for "hostport" definition
achar            = uchar / "&" / "=" / "~"           
                  ;; see [BASIC-URL] for "uchar" definition
enc_auth_type    = 1*achar
                  ;; encoded version of [SASL] "auth_type"
enc_user         = 1*achar
                  ;; encoded version of [HTTP] "userid"
iauth            = ";AUTH=" ( "*" / enc_auth_type )
iuserinfo        = enc_user iauth / [enc_user] iauth
```
hostport = host [ "":" port ]
;; If the port is empty or not given, port 80 is
;; assumed for the 'http' scheme and port 443 for
;; 'https' scheme.

The semantics are that the identified resource is located at the
server listening for TCP connections on that port of that host, and
the Request-URI for the resource is abs_path (section 5.1.2). The
use of IP addresses in URLs SHOULD be avoided whenever possible (see
RFC 1900 [24]). If the abs_path is not present in the URL, it MUST
be given as "/" when used as a Request-URI for a resource (section
5.1.2). If a proxy receives a host name which is not a fully
qualified domain name, it MAY add its domain to the host name it
received. If a proxy receives a fully qualified domain name, the
proxy MUST NOT change the host name.
3. HTTP User Name and Authentication Mechanism

A user name and/or authentication mechanism may be supplied. They are used to construct Authorization header as described in SASL in HTTP 1.1 [HTTP-SASL] after making the connection to the HTTP server. If no user name and no authentication mechanism is supplied, no user authentication is performed.

An authentication mechanism can be expressed by adding ";AUTH=<enc_auth_type>" to the end of the user name. When such an <enc_auth_type> is indicated, the client SHOULD request appropriate credentials from that mechanism and use SASL authentication as described in SASL in HTTP 1.1 [HTTP-SASL]. If no user name is specified, one SHOULD be obtained from the mechanism or requested from the user (for interactive clients) or from configuration database (for non-interactive client) as appropriate.

The string ";AUTH=" indicates that the client SHOULD select an appropriate authentication mechanism. It MAY use any SASL mechanism listed in the response to the OPTIONS request containing "Authorization: SASL" header (see section 4.3.1.2 of SASL in HTTP 1.1 [HTTP-SASL]). If no user name is specified and no appropriate authentication mechanisms are available, the client SHOULD fall back to using unauthenticated HTTP connection. This allows a URL which grants read-write access to authorized users, and read-only anonymous access to other users.

If a user name is included with no authentication mechanism, then ";AUTH=" is assumed.

A program interpreting HTTP URLs MAY cache open connections to an HTTP server for later re-use. If a URL contains a user name, only connections authenticated as that user may be re-used. If a URL does not contain a user name or authentication mechanism, then only an anonymous connection may be re-used. If a URL contains an authentication mechanism without a user name, then any non-anonymous connection may be re-used.

Note that if unsafe or reserved characters such as " " or ";" are present in the user name or authentication mechanism, they MUST be encoded as described in RFC 1738 [BASIC-URL].
4. Security Considerations

Since URLs can easily come from untrusted sources, care must be taken when resolving a URL which requires or requests any sort of authentication. If authentication credentials are supplied to the wrong server, it may compromise the security of the user’s account. The program resolving the URL should make sure it meets at least one of the following criteria in this case:

1. The URL comes from a trusted source, such as a referral server which the client has validated and trusts according to site policy. Note that user entry of the URL may or may not count as a trusted source, depending on the experience level of the user and site policy.

2. Explicit local site policy permits the client to connect to the server in the URL. For example, if the client knows the site domain name, site policy may dictate that any hostname ending in that domain is trusted.

3. The user confirms that connecting to that domain name with the specified credentials and/or mechanism is permitted.

4. A mechanism is used which validates the server before passing potentially compromising client credentials.

5. An authentication mechanism is used which will not reveal information to the server which could be used to compromise future connections.

URLs which do not include a user name must be treated with extra care, since they are more likely to compromise the user’s primary account. A URL containing ";AUTH=*" must also be treated with extra care since it might fall back on a weaker security mechanism. Finally, clients are discouraged from using a plain text password as a fallback with ";AUTH=*" unless the connection has strong encryption (e.g. a key length of greater than 56 bits).
5. Acknowledgements

When writing this document some text was borrowed from RFC 2192 ("IMAP URL Scheme") by Chris Newman.
6. Open Issues/ToDo

1. Add support for ";REALM=<realm>"?

2. Add support for Basic/Digest authentication? This can be done by using ";AUTH=Basic" and ";AUTH=DIGEST" respectively, as currently there is no name conflict with any existing SASL mechanisms.

3. Should I update/add IANA registration for HTTP/HTTPS?

4. Should I update rules for HTTP URL comparison?

5. Should I add an informative section describing how major deployed clients/servers handle the extension?
Normative References


Informative References


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