XEP-0156: Discovering Alternative XMPP Connection Methods

Joe Hildebrand
mailto:jhildebr@cisco.com
xmpp:hildjj@jabber.org

Peter Saint-Andre
mailto:xsf@stpeter.im
xmpp:peter@jabber.org
http://stpeter.im/

Lance Stout
mailto:lance@andyet.com
xmpp:lance@lance.im

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This document defines a DNS TXT Resource Record format for use in discovering alternative methods of connecting to an XMPP server.

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Contents

1 Introduction

Although XMPP Core [1] specifies the use of TCP as the method of connecting to an XMPP server, alternative connection methods exist, including the BOSH (XEP-0124) [2] method (for which XMPP Over BOSH (XEP-0206) [3] is the XMPP profile) and the websocket subprotocol specified in RFC 7395 [4]. For some of these methods, it is necessary to discover further parameters before connecting, such as the HTTP URL of an alternative connection manager. Without ways to auto-discover alternative connection methods, the relevant information would need to be provided manually by a human user (which is cumbersome and error-prone) or hard-coded into XMPP software applications (which is brittle and not interoperable).
This document defines two ways to encapsulate information about alternative connection methods for auto-discovery:

1. DNS TXT resource records
2. Link entries in a server's "host-meta" file

2 DNS Lookup Method

2.1 Record Format

The following format for DNS TXT resource records is specified in RFC 1464:

```
<owner> <class> <ttl> <TXT> <"attribute_name=attribute_value">
```

This document specifies that the following additional rules apply for DNS TXT resource records used to specify alternative connection methods:

1. It is RECOMMENDED for the owner to be "_xmppconnect".
2. The class field SHOULD be IN.
3. The ttl field is OPTIONAL.
4. The attribute name SHOULD begin with the string "_xmpp-client-" or "_xmpp-server-" and SHOULD be registered as described in the XMPP Registrar Considerations section of this document.
5. If the txt-data field contains only an attribute name (i.e., no unquoted "=" character followed by additional characters), the receiving application SHOULD interpret it as indicating the presence of the attribute or feature with no defined value.

[1] RFC 6120: Extensible Messaging and Presence Protocol (XMPP): Core <http://tools.ietf.org/html/rfc6120>.
[2] XEP-0124: Bidirectional-streams Over Synchronous HTTP <https://xmpp.org/extensions/xep-0124.html>.
[3] XEP-0206: XMPP Over BOSH <https://xmpp.org/extensions/xep-0206.html>.
[4] RFC 7395: An Extensible Messaging and Presence Protocol (XMPP) Subprotocol for WebSocket <http://tools.ietf.org/html/rfc7395>.

6. If the txt-data field contains an unquoted "=" character, it MUST also contain an attribute value.

2.2 Business Rules

The following business rules apply:

1. TXT lookups MUST be used only as a fallback after the methods specified in RFC 6120 have been exhausted. [5]
2. A domain SHOULD NOT present information in DNS TXT records that is available via the DNS SRV records defined in RFC 6120.
3. The order of DNS TXT records SHOULD NOT be interpreted as significant by the presenting domain or the receiving entity.

2.3 Examples

The following examples show two DNS TXT resource records: the first indicates support for the XMPP Over BOSH connection method defined in XEP-0124 and XEP-0206 and the second indicates support for XMPP over WebSocket connections defined in RFC 7395;.

Listing 1: TXT Resource Records

```
_xmppconnect IN TXT "_xmpp-client-xbosh=https://web.example.org:5280/
    bosh"
_xmppconnect IN TXT "_xmpp-client-websocket=wss://web.example.com:443/
    ws"
```

3 HTTP Lookup Method

3.1 Link Format

The HTTP lookup method uses Web Host Metadata RFC 6415 [6] to categorize and list the URIs of alternative connection methods. It is primarily intended for use by clients in environments where the ability to perform DNS queries is restricted, such as in web browsers.
Each alternative connection method is specified in the host-meta (XRD) file using a distinctive link relation RFC 5988 [7]. This specification defines several extension relation types:

- urn:xmpp:alt-connections:httppoll

[5] The point of this rule is to prevent someone from defining a new XEP-0156 connection method like "_xmpp-client-tcp" to override the SRV records defined in the core XMPP specification.
[6] RFC 6415: Web Host Metadata <http://tools.ietf.org/html/rfc6415>.
[7] RFC 5988: Web Linking <http://tools.ietf.org/html/rfc5988>.

- urn:xmpp:alt-connections:websocket
- urn:xmpp:alt-connections:xbosh

3.2 Business Rules

The following business rules apply:

1. HTTP queries for host-meta information MUST be used only as a fallback after the methods specified in RFC 6120 have been exhausted.
2. A domain SHOULD NOT present information in host-meta link records that is available via the DNS SRV records defined in RFC 6120.
3. The order of XMPP related link entries in the host-meta file SHOULD NOT be interpreted as significant by the presenting domain or the receiving entity.

3.3 Examples

The following examples show two host-meta link records: the first indicates support for the XMPP Over BOSH connection method defined in XEP-0124 and XEP-0206 and the second indicates support for the XMPP Over WebSocket connection method defined in RFC 7395 [8].
As specified in RFC 6120 §3, support for the XML encoding of the host-meta resource is REQUIRED while alternative representations such as JSON are OPTIONAL.

Listing 2: Result for /.well-known/host-meta

```
<?xml version='1.0' encoding='utf-8'?>
<XRD xmlns='http://docs.oasis-open.org/ns/xri/xrd-1.0'>
  ...
  <Link rel="urn:xmpp:alt-connections:xbosh"
        href="https://web.example.com:5280/bosh" />
  <Link rel="urn:xmpp:alt-connections:websocket"
        href="wss://web.example.com:443/ws" />
  ...
</XRD>
```

It is possible to use an alternative JSON format for host-meta information, in which case the above example would be presented as:

Listing 3: Result for /.well-known/host-meta.json

```
{
  ...
```

[8] RFC 7395: An Extensible Messaging and Presence Protocol (XMPP) Subprotocol for WebSocket <http://tools.ietf.org/html/rfc7395>.

```
  "links": [
    ...
    {
      "rel": "urn:xmpp:alt-connections:xbosh",
      "href": "https://web.example.com:5280/bosh"
    },
    {
      "rel": "urn:xmpp:alt-connections:websocket",
      "href": "wss://web.example.com:443/ws"
    }
  ]
}
```

4 Implementation Notes

To make connection discovery work in web clients (including those hosted on a different domain) the host service SHOULD set appropriate CORS headers for Web Host Metadata files. The exact headers and values are out of scope of this document but may include: *Access-Control-Allow-Origin*, *Access-Control-Allow-Methods* and *Access-Control-Allow-Headers*.
Due care has to be exercised in limiting the scope of *Access-Control-Allow-Origin* response header to Web Host Metadata files only.

```
Access-Control-Allow-Origin: *
```

Access-Control-Allow-Origin header with a value of * allows JavaScript code running on a different domain to read the content of Web Host Metadata files. Special value * ensures that the request will only succeed if it is invoked without user credentials (e.g. cookies, HTTP authentication).

5 Security Considerations

It is possible that advertisement of alternative connection methods can introduce security vulnerabilities, since a connecting entity (usually a client) might deliberately seek to connect using the method with the weakest security mechanisms (e.g., no channel encryption or relatively weak authentication). Care needs to be taken in determining which alternative connection methods are appropriate to advertise.
Entities that use these connection methods MUST conform to the security considerations of each method, for example by preferring to use 'https' or 'wss' URLs that are protected using Transport Layer Security (TLS).

6 IANA Considerations

Because the link relations specified here are extension relation types rather than registered relation types (see Section 4 of RFC 5988), this document requires no interaction with the Internet Assigned Numbers Authority (IANA) [9].

7 XMPP Registrar Considerations

7.1 Namespaces

The XMPP Registrar [10] shall include 'urn:xmpp:alt-connections' in its registry of protocol namespaces (see <https://xmpp.org/registrar/namespaces.html>).

- urn:xmpp:alt-connections

7.2 Alternative Connection Methods Registry

The XMPP Registrar [11] maintains a registry of attributes for use in DNS TXT resource records that advertise alternative XMPP connection methods (see <https://xmpp.org/registrar/alt-connections.html>).

7.2.1 Process

In order to submit new values to this registry, the registrant shall define an XML fragment of the following form and either include it in the relevant XMPP Extension Protocol or send it to the email address <registrar@xmpp.org>:

```
<method>
  <name>the name of the attribute to be used in DNS TXT records</name>
  <desc>a natural-language description of the alternative connection
     method</desc>
  <syntax>the syntax of the DNS TXT record attribute value</syntax>
  <doc>the document in which the alternative connection method is
     specified</doc>
```

[9] The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols, such as port numbers and URI schemes. For further information, see <http://www.iana.org/>.

[10] The XMPP Registrar maintains a list of reserved protocol namespaces as well as registries of parameters used in the context of XMPP extension protocols approved by the XMPP Standards Foundation. For further information, see <https://xmpp.org/registrar/>.

[11] The XMPP Registrar maintains a list of reserved protocol namespaces as well as registries of parameters used in the context of XMPP extension protocols approved by the XMPP Standards Foundation. For further information, see <https://xmpp.org/registrar/>.

```
</method>
```

The registrant can register more than one attribute at a time, each contained in a separate <method/> element.

7.2.2 Registered Values

This document registers the following values.

```
<method>
  <name>_xmpp-client-httppoll</name>
  <desc>HTTP Polling connection method</desc>
  <syntax>
    The http: or https: URL at which to contact the HTTP Polling
        connection manager or proxy
  </syntax>
  <doc>XEP-0025</doc>
</method>

<method>
  <name>_xmpp-client-websocket</name>
  <desc>XMPP Over WebSocket connection method</desc>
  <syntax>
    The ws: or wss: URL at which to contact the WebSocket connection
        manager or proxy
  </syntax>
  <doc>RFC 7395</doc>
</method>

<method>
  <name>_xmpp-client-xbosh</name>
  <desc>XMPP Over Bosh connection method</desc>
  <syntax>
    The http: or https: URL at which to contact the HTTP Binding (BOSH
        ) connection manager or proxy
  </syntax>
  <doc>XEP-0206</doc>
</method>
```