This document proposes improvements to the XML stream features definition for inclusion in the specification that supersedes RFC 3920.
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Contents

1 Introduction .......................................................... 1
2 Required Flag ......................................................... 1
3 Dialback Stream Feature ........................................... 4
4 Security Considerations ........................................... 6
5 IANA Considerations ................................................ 6
6 XMPP Registrar Considerations ..................................... 6
   6.1 Stream Features .................................................. 6
7 XML Schema .......................................................... 7
   7.1 SASL Stream Feature ............................................. 7
   7.2 Resource Binding Stream Feature ............................... 8
   7.3 Server Dialback Stream Feature ................................. 9
8 Acknowledgements .................................................... 10
1 Introduction

RFC 3920 introduced the concept of stream features. Implementation experience has revealed several shortcomings in the current definition and usage of stream features:

- Because not all stream features include a mechanism for specifying that negotiation of the feature is required, servers and clients cannot know with certainty when the stream negotiation has been completed and therefore when it is acceptable to begin sending XML stanzas over the stream.
- The server dialback protocol does not have a stream feature associated with it.

Those shortcomings are addressed in this document.

Note: The recommendations from this document were NOT incorporated into RFC 6120 \(^1\) and this document is Obsolete.

2 Required Flag

The XMPP stream feature for Transport Layer Security (TLS) includes a `<required/>` child element that can be used to indicate that negotiation of TLS must be completed before proceeding with the rest of the stream negotiation. However, as defined in RFC 3920 the remaining stream features do not include the ability to flag that negotiation of the feature is required in order to (1) proceed with the negotiation or (2) begin sending XML stanzas. Because the non-TLS features lack a required flag, it is not possible for the initiating entity to know definitively how to proceed at any given stage in the stream negotiation, and the only way for the initiating entity to know whether it may begin sending XML stanzas is to attempt to send them (the receiving entity will return a `<not-authorized/>` stream error if not all required features have been negotiated). This state of affairs is suboptimal. Therefore, every stream feature must include the ability to flag the feature as required or not required.

When the initiating entity receives a stream features element with no features containing a `<required/>` element, it knows that the receiving party will accept XML stanzas over the stream.

The following examples show a possible flow of stream negotiation between a client and a server, using the required flag for all but one of the features and following the order specified in Recommended Order of Stream Feature Negotiation (XEP-0170) \(^2\). (This example is more verbose than a typical stream negotiation flow, but is provided here for the sake of completeness.)

---


Listing 1: A stream negotiation

C:  <stream:stream
    xmlns='jabber:client'
    xmlns:stream='http://etherx.jabber.org/streams'
    to='example.com'
    version='1.0'>

S:  <stream:stream
    xmlns='jabber:client'
    xmlns:stream='http://etherx.jabber.org/streams'
    id='c2s_123'
    from='example.com'
    version='1.0'>

S:  <stream:features>
    <starttls xmlns='urn:ietf:params:xml:ns:xmpp-tls'>
        <required/>
    </starttls>
</stream:features>

C:  <starttls xmlns='urn:ietf:params:xml:ns:xmpp-tls'/> 

S:  <proceed xmlns='urn:ietf:params:xml:ns:xmpp-tls'/> 

[TLS negotiation]

C:  <stream:stream
    xmlns='jabber:client'
    xmlns:stream='http://etherx.jabber.org/streams'
    to='example.com'
    version='1.0'>

S:  <stream:stream
    xmlns='jabber:client'
    xmlns:stream='http://etherx.jabber.org/streams'
    from='example.com'
    id='c2s_234'
    version='1.0'>

S:  <stream:features>
    <mechanisms xmlns='urn:ietf:params:xml:ns:xmpp-sasl'>
        <mechanism>EXTERNAL</mechanism>
        <mechanism>DIGEST-MD5</mechanism>
        <mechanism>PLAIN</mechanism>
        <required/>
    </mechanisms>
</stream:features>

C:  <auth xmlns='urn:ietf:params:xml:ns:xmpp-sasl'>
mechanism=’DIGEST-MD5’>

S: <challenge xmlns='urn:ietf:params:xml:ns:xmpp-sasl'>
    cmVhbG09InNvbWVyZWFsbSIsbms9uy2U9Ik9BNk1HOXRFUUtMmhoiixxb3A9ImFl6g1

    LGNoYXJzZXQ9dXRmLTgsYWxnb3JpdGhtPW1kNS1zZXNzCg==
</challenge>

C: <response xmlns='urn:ietf:params:xml:ns:xmpp-sasl'>
    dXNlcm5hbWU9InNvbWVub2RlIixyZWFsbT0ic29tZXJjYWxtIixub25jZT0i
    T0E2TUc5dEVRR20yaGgiLGNub25jZT0iT0E2TUUhYaDZWCVRyUmsiLGl5jPTAw
    MDAwMDAxLHFvcD1hdXRoLGRpZ2VzdC11cmk9InhtcHAvZXhhbXBsZS5jbi20i
    LJhlc3BvbnN1PWQzODhkYWQ5MGRyQ0YmJkJ0YwMTQzYWy3LGNoYXJzZXQ9dXRmLTgK
</response>

S: <challenge xmlns='urn:ietf:params:xml:ns:xmpp-sasl'>
    cnNwYXV0aD1lYTQwMzM1YzQyN2I1NTI3Yjg0ZGJhYmNkZmZmZAo=
</challenge>

C: <response xmlns='urn:ietf:params:xml:ns:xmpp-sasl'/>
3 Dialback Stream Feature

As specified in RFC 3920, support for the server dialback protocol is currently advertised through inclusion of a dialback namespace prefix in the stream header:

Listing 2: Stream header with dialback namespace advertisement

```
<stream:stream
    xmlns:stream='http://etherx.jabber.org/streams'
    xmlns='jabber:server'
    xmlns:db='jabber:server:dialback'
    id='s2s_123'>
```

However, it is not clear if inclusion of the dialback namespace indicates that a server supports the server dialback protocol or that it requires negotiation of server dialback. To make this
clear, we define a stream feature for server dialback:

Listing 3: Dialback stream feature

```
<stream:features>
  <dialback xmlns='urn:xmpp:features:dialback'>
    <required/>
  </dialback>
</stream:features>
```

Consider the following scenario, in which Server1 provides a self-signed certificate. According to Server2’s local service policy, it does not consider self-signed certificates to be trustworthy and therefore requires negotiation of server dialback in this case.

Listing 4: A stream negotiation with server dialback

```
S1: <stream:stream
    xmlns='jabber:server'
    xmlns:db='jabber:server:dialback'
    xmlns:stream='http://etherx.jabber.org/streams'
    to='example.com'
    version='1.0'>

S2: <stream:stream
    xmlns='jabber:server'
    xmlns:db='jabber:server:dialback'
    xmlns:stream='http://etherx.jabber.org/streams'
    id='s2s_123'
    from='example.com'
    version='1.0'>

S2: <stream:features>
    <starttls xmlns='urn:ietf:params:xml:ns:xmpp-tls'>
      <required/>
    </starttls>
</stream:features>


S1: <stream:stream
    xmlns='jabber:server'
    xmlns:db='jabber:server:dialback'
    xmlns:stream='http://etherx.jabber.org/streams'
    to='example.com'
    version='1.0'>

S2: <stream:stream

6 XMPP Registrar Considerations

As specified in Server Dialback (XEP-0220), the XMPP Registrar includes a dialback stream feature of 'urn:xmpp:features:dialback' in its registry of stream features (see <https://xmpp.org/registrar/stream-features.html>).

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1The 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/>.


3The 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/>.
7 XML Schema

7.1 SASL Stream Feature

Note: The following provisional schema is intended to replace the existing schema for the SASL stream feature.

```xml
<?xml version='1.0' encoding='UTF-8'?>
<xs:schema
    xmlns:xs='http://www.w3.org/2001/XMLSchema'
    targetNamespace='urn:ietf:params:xml:ns:xmpp-sasl'
    xmlns='urn:ietf:params:xml:ns:xmpp-sasl'
    elementFormDefault='qualified'>

  <xs:element name='mechanisms'>
    <xs:complexType>
      <xs:sequence>
        <xs:element name='mechanism' maxOccurs='unbounded' type='xs:string'/>
        <xs:element name='required' minOccurs='0' maxOccurs='1' type='empty'/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:element name='auth'>
    <xs:complexType>
      <xs:simpleContent>
        <xs:extension base='xs:string'>
          <xs:attribute name='mechanism' type='xs:string' use='optional'/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
  </xs:element>

  <xs:element name='challenge' type='xs:string'/>
  <xs:element name='response' type='xs:string'/>
  <xs:element name='abort' type='empty'/>
  <xs:element name='success' type='empty'/>

  <xs:element name='failure'>
    <xs:complexType>
      <xs:choice minOccurs='0'>
        ...
      </xs:choice>
    </xs:complexType>
  </xs:element>

</xs:schema>
```
7.2 Resource Binding Stream Feature

Note: The following provisional schema is intended to replace the existing schema for the Resource Binding stream feature.
7 XML SCHEMA

```xml
<xs:simpleType name='resourceType'>
  <xs:restriction base='xs:string'>
    <xs:minLength value='1'/> 
    <xs:maxLength value='1023'/> 
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name='fullJIDType'>
  <xs:restriction base='xs:string'>
    <xs:minLength value='8'/> 
    <xs:maxLength value='3071'/> 
  </xs:restriction>
</xs:simpleType>
</xs:schema>

7.3 Server Dialback Stream Feature
Note: The following defines a schema for the proposed Server Dialback stream feature.

```xml
<?xml version='1.0' encoding='UTF-8'?><xs:schema
  xmlns:xs='http://www.w3.org/2001/XMLSchema'
  targetNamespace='urn:xmpp:features:dialback'
  xmlns='urn:xmpp:features:dialback'
  elementFormDefault='qualified'>
<xs:element name='dialback'>
  <xs:complexType>
    <xs:sequence>
      <xs:element name='required' 
        minOccurs='0' 
        maxOccurs='1' 
        type='empty'/> 
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name='empty'>
    <xs:restriction base='xs:string'>
      <xs:enumeration value=''/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
</xs:schema>
8 Acknowledgements

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