XEP-0275: Entity Reputation

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This specification defines an XMPP protocol extension for communicating the reputation of any entity on the network.

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Contents

1 Introduction **1**

2 Terminology **1**

3 Approach **1**

3.1 Server Reputation 2

3.2 Account Reputation 3

3.3 Other Entities 4

4 Protocol **4**

5 Determining Support **5**

6 Internationalization Considerations **5**

7 Security Considerations **5**

8 IANA Considerations **5**

9 XMPP Registrar Considerations **6**

9.1 Protocol Namespaces 6

9.2 Protocol Versioning 6

10 XML Schema **6**

11 Acknowledgements **7**

1 Introduction

Reputation systems are used in many online communities to increase trust and to encourage communication, commerce, and other forms of interaction. The public XMPP network might benefit from instituting a reputation system for servers, for end users, or both. The benefits might include faster blocking of rogue servers and other bad actors, differential quality of service based on reputation, delayed entry to Multi-User Chat (XEP-0045) [1] rooms for low-reputation users, integration with Privacy Lists (XEP-0016) [2], and the like.

2 Terminology

The following terms identify the entities mentioned in this document:

- Inquirer -- the entity that queries a Rater about the reputation score of a Subject
- Rater -- an entity that maintains a reputation score about a Subject; a Rater might be a fellow IM user (e.g., a buddy in one's roster as defined in XMPP IM [3]), the server to which a client connects, a peer server to which a server connects (see Server Buddies (XEP-0267) [4]), or a specialized reputation service (similar to a DNSBL on the email network)
- Subject -- the entity whose reputation is asserted by a Rater

3 Approach

The approach taken here is that a Subject is "innocent until proven guilty", so it starts out with a score of zero. Good behaviors will increase a Subject's score (up to a maximum of +100), whereas bad behaviors will decrease a Subject's score (down to a minimum of -100). Any Inquirer can query any "Rater" about the reputation score of a Subject.
In the terms of A Model for Reputation Reporting [5] and A Media Type for Reputation Interchange [6], this protocol defines only one reputation reponse set, where the rater is making an assertion about the overall reputation of an XMPP entity.
To determine reputation in an objective way, it is important to define the specific behaviors that can be used as measurable dimensions of good or bad reputation. The following sections attempt to do so for XMPP servers and XMPP users, with some rough point values (naturally

[1] XEP-0045: Multi-User Chat <https://xmpp.org/extensions/xep-0045.html>.
[2] XEP-0016: Privacy Lists <https://xmpp.org/extensions/xep-0016.html>.
[3] RFC 6121: Extensible Messaging and Presence Protocol (XMPP): Instant Messaging and Presence <http://tools.ietf.org/html/rfc6121>.
[4] XEP-0267: Server Buddies <https://xmpp.org/extensions/xep-0267.html>.
[5] A Model for Reputation Reporting <http://tools.ietf.org/html/draft-ietf-repute-model>. Work in progress.
[6] A Media Type for Reputation Interchange <http://tools.ietf.org/html/draft-ietf-repute-media-type>. Work in progress.

these criteria are not meant to be exhaustive).

3.1 Server Reputation

On the theory that it is more important to reward positive behavior than to punish negative behavior, we define a number of criteria for increasing the reputation score of an XMPP server, along with a few criteria for decreasing the reputation score.

Criterion	
Presents a certificate issued by a recognized certification authority.	
Requires CAPTCHAs or other hurdles for account registration (see CAPTCHA Forms (XEP-0158) XEP-0158: CAPTC	
Supports XEP-0268: Incident Reporting.	
Supports reputation scores for its users (i.e., this protocol).	
Requires use of Transport Layer Security (TLS) for client-to-server connections.	
Provides the _xmpp-client DNS SRV record.	
Provides the _xmpp-server DNS SRV record.	
Provides a website with accurate information and contact addresses.	
Answers Service Discovery (XEP-0030) XEP-0030: Service Discovery <https://xmpp.org/extensions/xep-0030.htr	
Administrator answers email sent to mailto:xmpp@domain.tld (see XMPP Core RFC 6120: Extensible Messaging a	
Time online (e.g., based on whois lookup or known deployment of an XMPP service).	
Admin factor (average of admins' reputation scores, divided by ten and rounded up).	
Rate limiting (points per incident).	
Incident reports (points per validated report).	

For example, a server that (1) meets all of the foregoing criteria, (2) has been online for 7 years, and (3) whose admins have an average score of 37 would have a reputation score of 15+5+5+5+5+5+5+5+5+5+4+21 = 85.
By constrast, a server that does not have a CA-issued cert, does not require CAPTCHAs for account registration, does not support incident reporting, does not support reputation scores, does not require TLS, does have SRV records (+10), has no website, does not answer service discovery requests about its users, has not verified the xmpp@domain.tld email address, has been online for 1 week, whose administrators are unknown, that has experienced 1 rate limiting incident, and that has been the subject of 2 incident reports would have a reputation score of -15.

3.2 Account Reputation

The reputation associated with an XMPP account (typically but not always a user) is harder to quantify and easier to fake than server reputation. The following are some possible criteria.

Criterion	Suggested Point Value
Account has service discovery identity of account/admin	+15
Account has service discovery identity of account/registered	+5
Age of account	+5 for each year
Verified email address	+5
Verified website	+5
Reputation of buddies known to server	Divide average reputation by 10
User has PGP key, X.509 certificate, or other public key	+10
User has passed a CAPTCHA test (e.g., during account provisioning)	+5
Chatroom ownership / administration	For each room owned, divide room's reputation by 10; for each room administered, divide room's reputation by 20 (e.g., +6 and +3 for a room with a reputation of 60).
Chatroom banning	For each room in which the user is banned (XEP-0045 "outcast"), divide the room's reputation by 10 and decrement the user's score by the result (e.g., -6 for a room with a reputation of 60).
Rate limiting (points per incident)	-5
Incident reports (points per validated report)	-10

For example, an account that is an admin of a server (+15), has been online for 5 years (+25), has a verified email address (+5) and website (+5), has a "buddy reputation average" of 40 (+4), uses a public key (+10), has passed a CAPTCHA test (+5), owns 3 chatrooms with an average

reputation of 30 (+9), and has not been banned from any chatrooms, rate limited, or been the subject of any incident reports would have a reputation score of 78.
By contrast, an account that is registered (+5), was just created, has no verified email address or website, has a "buddy reputation average" of 10 (+1), does not use a public key, has not passed a CAPTCHA test, owns or administers no chatrooms, has been banned from 3 chatrooms with an average reputation of 30 (-9), has been rate limited twice (-10), and has been the subject of 2 incident reports (-20) would have a reputation score of -25.

3.3 Other Entities

Any entity can have a reputation score: servers, end-user accounts, chatrooms, chatroom servers, publish-subscribe servers, service directories (Service Directories (XEP-0309) [7]), third-party reputation services, etc. Criteria for entities other than servers and accounts are yet to be described.

4 Protocol

In order to query a Rater about the reputation of a Subject, an Inquirer sends an IQ stanza of type "get" containing a <score/> element and 'jid' attribute qualified by the 'urn:xmpp:reputation:0' namespace (see Namespace Versioning regarding the possibility of incrementing the version number).

Listing 1: Score request

```
<iq from='juliet@capulet.lit/chamber'
    to='shakespeare.lit'
    id='bn4c297j'
    type='get'>
  <score xmlns='urn:xmpp:reputation:0' jid='romeo@montague.lit'/>
</iq>
```

The Rater would then return an error or a score; if the latter, the <score/> element shall include both a 'jid' attribute and a 'num' attribute.

Listing 2: Score response

```
<iq from='shakespeare.lit'
    to='juliet@capulet.lit/chamber'
    id='bn4c297j'
    type='result'>
  <score xmlns='urn:xmpp:reputation:0'
         jid='romeo@montague.lit'
```

[7] XEP-0309: Service Directories <https://xmpp.org/extensions/xep-0309.html>.

```
        num='65'/>
</iq>
```

Any XMPP error might be appropriate (e.g., <forbidden/> if the Inquirer is not trusted at all by the Rater or <item-not-found/> if the Rater has no score information about the Subject).

5 Determining Support

To advertise its support for reputation scores, when replying to Service Discovery (XEP-0030) [8] information requests an entity MUST return a feature of 'urn:xmpp:reputation:0'.
In order for an application to determine whether an entity supports this protocol, where possible it SHOULD use the dynamic, presence-based profile of service discovery defined in Entity Capabilities (XEP-0115) [9]. However, if an application has not received entity capabilities information from an entity, it SHOULD use explicit service discovery instead.

6 Internationalization Considerations

The 'jid' attribute is a "JID slot" as described in rfc6122bis [10].

7 Security Considerations

Any entity can keep a reputation score (i.e., be a Rater) for any other entity. Although Raters might be considered more knowledgeable than others, that judgment is up to the Inquirer and is not a feature of the network itself.

8 IANA Considerations

This document requires no interaction with the Internet Assigned Numbers Authority (IANA) [11].

[8] XEP-0030: Service Discovery <https://xmpp.org/extensions/xep-0030.html>.
[9] XEP-0115: Entity Capabilities <https://xmpp.org/extensions/xep-0115.html>.
[10] Extensible Messaging and Presence Protocol (XMPP): Address Format <https://datatracker.ietf.org/doc/draft-ietf-xmpp-6122bis/>. Work in progress.
[11] 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/>.

9 XMPP Registrar Considerations

9.1 Protocol Namespaces

This specification defines the following XML namespace:

- urn:xmpp:reputation:0

Upon advancement of this specification from a status of Experimental to a status of Draft, the XMPP Registrar [12] shall add the foregoing namespace to the registry located at <https://xmpp.org/registrar/namespaces.html>, as described in Section 4 of XMPP Registrar Function (XEP-0053) [13].

9.2 Protocol Versioning

If the protocol defined in this specification undergoes a revision that is not fully backwards-compatible with an older version, the XMPP Registrar shall increment the protocol version number found at the end of the XML namespaces defined herein, as described in Section 4 of XEP-0053.

10 XML Schema

```
<?xml version='1.0' encoding='UTF-8'?>

<xs:schema
    xmlns:xs='http://www.w3.org/2001/XMLSchema'
    targetNamespace='urn:xmpp:reputation:0'
    xmlns='urn:xmpp:reputation:0'
    elementFormDefault='qualified'>

  <xs:element name='score'>
    <xs:complexType>
      <xs:simpleContent>
        <xs:extension base='xs:string'>
          <xs:attribute name='jid' type='xs:string' use='required'/>
          <xs:attribute name='num' type='ScoreNumber' use='optional'/>
        </xs:extension>
      </xs:simpleContent>
    </xs:complexType>
```

[12] 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/>.

[13] XEP-0053: XMPP Registrar Function <https://xmpp.org/extensions/xep-0053.html>.

```
  </xs:element>

  <xs:simpleType name="ScoreNumber">
    <xs:restriction base="xs:integer">
      <xs:maxInclusive value="100" />
      <xs:minInclusive value="-100" />
    </xs:restriction>
  </xs:simpleType>

</xs:schema>
```

11 Acknowledgements

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