

UNIFIED INSTANT MESSAGING SYNDICATION THROUGH CAPABILITIES NEGOTIATION AND FEDERATED USER DIRECTORY

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Research Disclosure database number 633077

Published in the January 2017 paper journal

Published digitally 22 December 2016 17:37 UT

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Unified Instant Messaging Syndication through Capabilities Negotiation and Federated User Directory

A method to enable instant messaging syndication is disclosed. This method involves the implementation of the capabilities negotiation protocol describer further on as well as the usage of a federated user directory.

Previous attempts to address this problem didn't address the full scope of the issue. New open protocols have been created with a specific client implementation in mind, with little care about the distinguished universe of different capabilities each instant messaging solution might want to add or already offer in their own ecosystem. Also, the much required user directory syndication has been ignored completely, which makes it impossible to integrate existing user bases altogether.

Some attempts to create multi-protocol clients have also failed because they only provided the least common denominator functionality between the protocols they tried to support and moreover they also ended up failing to keep up with the new security measures implemented by the authentication mechanisms of the services they tried to support.

It is important to notice current instant messaging solutions won't be interested in adopting a new protocol if it means giving up or hindering their own capabilities and features. So an all-inclusive protocol solution which allows for custom capabilities and only adds functionality without limiting the current features is required, which is what we are proposing.

To solve this problem, we need some means of unifying the instant messaging user directory as well as bridging the communication between all of the existing solutions. And this must be done in such a flexible way that doesn't break the existing functionality particular to existing solutions. Both problems can be solved, by means of a new capabilities negotiation protocol and a federated user directory.

The communication itself can be unified by means of standardizing the way messaging capabilities are presented and negotiated with the remote end point. In the capabilities negotiation protocol, keys are assigned for every capability, being their values another tree of keys and values which contain details about supported media. In this descriptive tree, 'text' is the most basic type and possibly expected to be always available, though some of its characteristics such as maximum text length and which character code is supported can be informed to maximize user satisfaction. For best results, these capabilities should be negotiated upon client handshake.

Capabilities listed by the protocol are absolutely descriptive and they present the remote end point with the optimal media formats supported by the local peer. Clients have full control and flexibility over how they deal with such information, whether they may choose to adapt the outgoing content in the best shape possible for the remote client, use the highest common denominator supported, stay

with a more conservative lowest common denominator (or even completely ignore any of the recommendations).

Of course, since clients could potentially assume that 'text' will be always available and the fact that the protocol is descriptive, providing nothing more than optimal suggestions, the clients might even opt to just fallback to whatever text format they want to send. It's entirely up to the client how it deals with the information provided by the capabilities negotiation protocol.

Other capabilities such as 'image', 'audio' and 'video' are considered to be optional and can also be provided with information about what formats and other characteristics are supported. Every client or solution will describe its capabilities so that the remote end point can always negotiate the best configuration for each available capability.

All of these features will allow current and future instant messaging solutions to add the benefit of cross-network communication without hindering their own custom capabilities. Future solutions might even opt to support the Unified Instant Messaging Protocol only, without the need to support more than one protocol.

The Unified Instant Messaging Protocol consists basically of two core components: capability negotiation and user directory.

Capabilities negotiation is responsible for leveling which and how capabilities will be available to a pair of end points. To each, only the available capabilities in the remote end point should be considered available so they can decide which format is the best to be correctly displayed by the receiving user.

Sample capabilities hash tree (in JSON format):

```
{
  "text": {
    "charset": "utf-8",
    "length": 256
  },
  "image": {
    "format": [
      "jpg",
      "png"
    ],
    "width": 640,
    "height": 480
  },
}
```

```

"audio": {
    "format": [
        "mp3",
        "ogg"
    ],
    "bitrate": 128000
},
"video": {
    "format": [
        "mp4",
        "avi"
    ],
    "width": 640,
    "height": 480
},
}

```

In the above example, the remote client informs that it supports receiving text, image, audio and video, while maximum length is 256 characters in the UTF-8 charset, images can be either in PNG or JPG format with a maximum dimension of 640x480 pixels, audio can be in either MP3 or OGG format on a 128 K bitrate and video can be in AVI or MP4 format with a resolution of 640x480 pixels. So the sender client can decide if it limits the text input or breaks a larger message in smaller chunks. It can also decide if it sends images in PNG or JPG and if it should scale the image before sending to optimize bandwidth consumption and remote displaying. Or even decide if it will not support such capability at all for whatever constraint or reason.

The unified user directory is essential for the solution, but it has nothing new about it. It can be a common directory implementation (e.g. LDAP / Yellow Pages) with user information such as the IDs (email address and / or phone number), the user handle (usually the full name, for directory search) and the latest connection information, which is how the user can be reached (IP address and / or current server). This information is replicated among servers participating in the federation network, for best availability. No sensitive or private data is stored in this directory, it contains only the public contact information necessary for instant messaging users to be able to find each other and initiate communication.

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