Investigation Standardisation Progress of Peer-to-Peer Session Intiation Protocol and Evaluating Existing Systems

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Abstract

This project is an extension of a project which was developed at Rhodes University in 2007, In this project an OverCord a P2P framework was developed to give P2P capability to a JAIN SIP Applet Phone. When this project was carried out, a work on decentralising SIP was done in the IETF where a working group was formed to develop a P2PSIP protocol. The main objective of this project is investigate the current status of P2PSIP in IETF working group with an aim to integrate some of the works into SIP UA under development at Rhodes University.

1   Introduction

The Session Initiation Protocol (SIP) [4] was created to facilitate the set-up, manage and teardown of multimedia sessions. Its regarded as one of the most popular protocols for providing real-time multimedia services. Today, SIP communication happens in client-server environment where centralised server like SIP server, IPABX or caller server to which SIP endpoints are connected remain in control during communication. The Internet Engineering Task Force (IETF) [3] is working on a new protocol that is combining SIP and Peer-to-Peer (P2P), this protocol is called Peer-to-Peer Session Initiation Protocol (P2PSIP).

P2PSIP [1] is a proposed model of combining SIP and P2P. The objective of this model is to eliminate the servers currently deployed in SIP by distributing the works

that servers would have done, spreading the works collectively among the endpoints or devices in the overlay [5]. This is done by replacing the traditional proxy-registrar function with a Distributed Hash Table (DHT). Basically, the DHT solves the problem of how to store, lookup and to arrange peers in its network by storing the data among the peers and remove the single point of failure. The main idea of P2PSIP is to get a system where endpoints can replicate all SIP server functionality by dividing up information (normally stored in server) spread that out among different devices and then on top of that is layered a SIP use.

Some of the highlighted use cases for P2PSIP are global Internet environment, public P2P Voice over IP (VoIP) service provider (an example is Skype), presence using multimedia consumer electronics devices and many more. Some of these use cases are difficult to implement using client-server SIP architecture. For example in wireless ad-hoc networks where infrastructure is limited but communication is required, such as in extreme emergency scenarios (Haiti earth quake), the SIP central server model becomes a central point of failure. On the other hand, P2P systems are robust against global catastrophic failure although single nodes may fail, self-managing and auto configuring [1].

2   Project description

This project is a built on the OverCord framework, a P2P framework that was developed as a part of Master's thesis [6] at Rhodes University [2] in 2007. The project was influenced by of the early proposed designs in the P2PSIP IETF working group. This project was not necessarily aimed to contribute to the design of the P2PSIP protocol but adapted some of the designs that were proposed by the P2PSIP IETF working group.

The SIP user agent which is being under development at Rhodes University is the

JAIN SIP Applet Phone, a SIP user-agent with presence, Instant Messaging (IM) and audio that support both real time with Real Time Protocol (RTP) or voice messaging using Transmission Control Protocol (TCP). Depending on your firewall, you can use User-Datagram Protocol (UDP) and do real-time voice. Otherwise, one can tunnel voice, IM and signalling through TCP. This phone can be launched as stand-alone user agent or embedded in an applet (the web application to access the applet is provided along with a customised version of the gateway) with presence.

2.1 Project Requirements

The introduction of a proposal typically acquaints the reader with the nature of problem being addressed and the basic idea of the project being proposed to address it. It should hit many of the points of the abstract while giving more of the motivation and need for the work being proposed. It should then lay out the structure of the paper, telling the reader what will be found in the sections which follow. Thus, the next sections should address the following topics:

- Linux machine with C++ compiler

- Java framework (Jcreator/NetBeans/Eclipse)

- Other requirements wil be identified at a late stage

2.2 Objectives

The current project is an extension of another project. When this project was carried out, the group was still discussing on how to standardise P2PSIP. The task of this project is to continue investigate where the other project [**?**] investigation on the P2PSIP in IETF has stopped. This means to carry forward by analysing and comparing the design proposed in the drafts that are being published, investigate what has been achieved since then and what is left to be achieved. We will look at

which systems are currently available that are using some of the design that are in the drafts, we will come up with some choosing criteria (maybe choosing the design depending on the popularity of the draft in which the design is proposed). We will then choose the best available design that could be useful in integrating P2P capacity in JAIN SIP Applet Phone. It seem like standardisation is nearly achieved. We might use some of the decisions designs that will lead to standardised P2PSIP protocols to incorporate P2P capability into JAIN SIP Applet Phone but any available framework capable of giving P2P capability to a Jain SIP Applet Phone can be used even if that framework did not incorporate the design proposed or decided in the P2PSIP working group.

In conclusion, the objectives are:

1. Analyse the status of P2PSIP in the P2PSIP IETF working group.

2. Identify open issues about P2PSIP that are still being discussed by P2PSIP IETF working group.

3. Test, analyse, and compare some of the available P2PSIP systems.

4. Possibly, provide an indication as to how to integrate some of the findings in P2PSIP IETF working group into OverCord.

2.3   Deliverables

There are two main deliverables from the work done in this project. The first deliverable is to provide an overview of the standardisation progress of the P2PSIP in IETF. The second deliverable is to provide a comparison of different P2PSIP implementations in order to recommend one that may be suitable for use in future research activities. That is, recommend an implementation that seems to follow the same path being taken by the P2PSIP IETF working group.

3 Approach to the study

This project will be approached by a literature study, first one must get familiar with SIP in general and how it works, and then with the P2P system. Since this project is based on IETF working group, it will require reading and understanding of the current ongoing discussion in the P2PSIP group, read the drafts and search for some implemented systems that uses some of the design in the drafts. After this, a presentations of the findings will be hold in the small group between the co-supervisor and supervisor to explain to them the findings. The understanding of JMF, JAIN SIP specifications, and SIP programming is required before the implementation part is carried out. Before the implementation, everything must be set up, and then the critical part of the project will start. The available open source P2P framework will be used or modified instead of starting from scratch.

4 Conclusion

It must be stressed that the work proposed in this proposal might not ba carried out as it mentioned it here. It might change any time but align itself to this proposal. The important thing about this proposal is to express the ideal work to be carried and lay out primary objectives of the project.

References

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