Mconf: collaboration proposal to form a global infrastructure for web conferencing based on open source

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Abstract:
The objective of this paper is to present and propose collaboration to the world to join the global web conferencing network known as Mconf (http://mconf.org), which is an open source distributed, scalable and federated global webconference system, with mobile access, composed of four main entities: 1) a customizable web portal that provides access to web conferences, shared documents, spaces and more; 2) a load balancer that allows the system to scale to thousands of users; 3) a web conferencing system powered by BigBlueButton; 4) a mobile web conferencing client. The only requirement for an institution to join the global network is to provide one server with enough resources (CPU and network) to meet the demand of their users. After that, the use of a global network brings many advantages, like: a) if one server fails, others can assume their users temporarily; b) if one server is overwhelmed, others can supply the extra demand; c) some servers which are idle during the night can supply the demand of the other part of the globe which is working during the day; d) servers can be allocated on demand in a virtualized dynamic cloud architecture.
Keywords: Distributed systems; Monitoring; Videoconference.

1. Introduction

The Mconf Global Network (https://mconf.org) is an open source, distributed, scalable and federated global webconference system, with mobile access. The base for the system is an open source application called “Mconf: Multiconference for interoperable access web and mobile devices”. An in depth view of Mconf system can be seen in the book chapter of Roesler [1].

The network proposed by Roesler was launched in June, 2012, and by January, 2013 (submission of this paper) had the geographic distribution shown in Figure 1, with 11 servers distributed among three continents and with some countries and states in a pre-deployment phase. In a few years we expect an increase in this number to hundreds of servers cooperating to form a world global webconference network, serving thousands of users daily.

One problem that will be addressed in this paper is how to manage a global webconference network. The main aspects are:

1. How to keep all the servers up-to-date and with the same software version, yet at the same time with custom themes and configuration depending on who is using it?
2. How to generate real time and historical usage statistics of the entire network and also for individual institutions?
3. How to guarantee the availability in case of a server crash? How to cope with surges in webconference traffic?

The rest of the paper explains Mconf’s method to cope with the above questions.

2. Methods

The way to distribute software and configuration, dispensing actions from the system administrators, is performed on Mconf through Opscode Chef (http://www.opscode.com/chef/), an open-source systems integration framework built specifically to automate the cloud. On Chef the developers write Ruby scripts, called Recipes, that are distributed over clients (Chef Clients) through a Chef Server. The framework is very flexible and enables assignment of different roles (a set of recipes and attributes) to clients, and the recipes may do anything, from software installation to fine tuning configuration.

With such mechanism the user experience is preserved, since the software is dynamically installed and configured on all servers in a short period of time, but it doesn't mean that institutions connected to the Network won't be able to brand Mconf and use different configurations. On the contrary, institutions will still be able to use different themes and configurations, with the guarantee that in any server of the infrastructure their users will have the same user experience (with the same theme and configuration).

Related to statistics and reports, in order to manage a big cooperation network, it is paramount to have a good monitoring system to generate statistics and reports, in order to better know the webconference usage of each institution and of the whole system in a global way. The Mconf group created a mechanism which generates graphics and reports to keep each server manager informed on how its users are using the system.

It is possible to filter the statistics for institution, group of institutions or the entire network. It is also possible to choose a period of time, getting information on how the users behave during some specific period of interest. The main information are the number of meetings, average meeting duration, average maximum number of users and maximum number of simultaneous users. Also one institution can see their usage profile regarding the distribution according to the virtual room size (i.e. number of users).

It is also possible to know the number of meetings by each server through a period of time. There are also graphics of CPU and bandwidth over time for each server, and there is an option to show the number of users per institution throughout time. The purpose of this information is to show how the servers in the network are being used, taking some measure if an institution is “abusing” the network, for example.

Besides the generation of asynchronous reports like the ones explained above, the system also supports a real time view, provided by a dashboard, presented in Figure 2. The dashboard
provides instant knowledge of what is going on in the global network. For example, the figure shows that, in this particular moment, there are 13 users divided in three virtual rooms (6 users, 5 users and 2 users). The figure also shows the time distribution of the users for the last 4 hours, and statistics of users, CPU load, RAM memory and network bandwidth for each server.

![Mconf Load Balance](image)

**Figure 2.** Distribution of meetings per server.

Related to availability, one of the great benefits of a global distributed network is exactly in terms of availability and resource optimization. If there is a surge in the webconference traffic of one institution connected to the global network, due to a scheduled event like a big conference, for example. This event may be streamed over the Internet, and many webconference rooms may be used at the same time. Instead of having to install more servers beforehand, the webconference managers of the institution can remain peacefully calm knowing that the global network will absorb such peak of traffic providing the resources needed from other servers connected to the network.

4. Conclusions

This paper presented the Mconf system, as well as an invitation to join this initiative and the management strategy used in the global webconference network. With this strategy, NRENs who join the network can unite in an effort to create a global federated webconference service, and this union has the potential to raise a robust, flexible and practical platform, strengthening the communication among the partners and the world.

The open source application developed is an ongoing R&D project that will be evaluated in 2013 in an experimental service to be included in Brazilian NREN RNP (National Research and Education Network) [2] production services roadmap. The Mconf Global Network discussed in
this paper is currently a rich source of experiments to establish a common multiconference network to enable NRENs’ collaboration in that matter. Further discussion about governance of the Global Network should be explored with the NRENs’ community among others stakeholders in order to design the model and grow the maturity of the technology and policies.

Additionally, Mconf is the webconference platform in Clara Network (Cooperación Latino Americana de Redes Avanzadas), and the Latin American service is in use since 2012.

All the source code of the Mconf project is available under open source licenses in https://github.com/mconf. The main links are:

- Mconf-Live: https://github.com/mconf/bigbluebutton
- Mconf-Mobile: https://github.com/mconf/mconf-mobile
  - Mconf-Mobile is available for free on Google Play.

There is also a demo server available at https://mconf.org that currently has about 400 communities and 1200 users worldwide.

References and Notes


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