

# Implementation of Load-balancing for Distributed Video Conferencing System

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**Abstract**— This paper describes the implementation of load-balancing for Distributed Video Conferencing System within the Academic Scientific Research Computer Network of Armenia (ASNET-AM). Video Conferencing Systems are important tools, used today, especially considering the limitations for prevention of coronavirus (COVID-19) spread. It's already more than a year, that ASNET-AM provides its videoconferencing and distance learning platforms for science and education organizations of Armenia to assist in organizing the online work and educational process. Because of high load on such systems during that period, the system described here was implemented to provide multi-node load-balanced operation of videoconferencing system. The system described is now actively used in production in ASNET-AM and provides videoconferencing service for different science and education organizations of Armenia.

**Keywords**— Networking, Videoconference, Load-balance, Online, Distance Learning, BigBlueButton, Scalelite.

## I. INTRODUCTION

Since spring 2020, the Academic Scientific Research Computer Network of Armenia (ASNET-AM) [1] has rapidly responded to the increased demand for online meeting tools. COVID-19 pandemic changed the situation worldwide [2],[3] and the ASNET-AM team provided a suitable cost-effective solution to the Scientific & Research Community of Armenia. Just in March 2020, the following announcement was posted at ASNET-AM website: “Taking into account the current situation and constraints operating in the Republic of Armenia for prevention of coronavirus (COVID-19) spread, ASNET-AM provides its videoconferencing and distance learning platforms for science and education organizations to assist in organizing the online work and educational process”.

The main platform provided is MEET.ASNET.AM [4], which is based on freely distributed BigBlueButton solution [5], enhanced by Scalelite open-source load balancer [6] to multi-node load-balanced videoconferencing system.

## II. BASIC IMPLEMENTATION

Main goal of implementing “on-premises” videoconferencing platform within ASNET-AM network was to have locally managed and physically located within the country service for science and education organizations of Armenia to assist in organizing the online work and educational processes.

In basic implementation, MEET.ASNET.AM system provides the following features:

- create room for multi-user video conference
- lock the room with password
- take shared notes and save them
- use whiteboard, where all participants can work
- upload presentation to the whiteboard
- stream video from external link
- use public or private chats
- create Breakout Rooms for teamwork
- create polls
- share screen

In order, to access MEET.ASNET.AM system, no additional client software is required to be installed. Instead, access is browser-based.

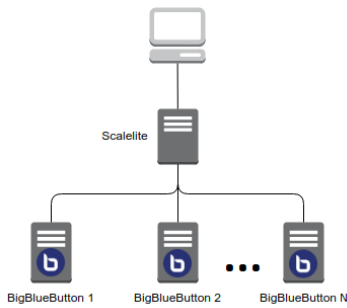


Picture 1

Basic implementation (Picture 1) is enough for organizing the online work and educational process of small teams, but for large audience it should be made more redundant.

### III. LOAD-BALANCING

Redundancy is done by means of Scalelite load balancer (Picture 2).



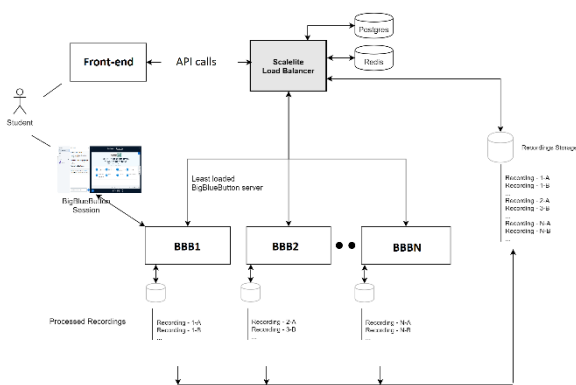
Picture 2

When Scalelite receives an incoming API request to create a new meeting, it redirects the new meeting to the group with the least congested server. In this way, Scalelite can evenly balance the workload of the meetings. Additionally, centralized storage of meetings recordings is implemented, as well as load monitoring of nodes (Picture 3).



Picture 3

The structure of whole system is presented in Picture 4.



Picture 4

### IV. CONCLUSION

By implementing the described load-balancing mechanism for video conferencing system, a distributed multi-node load-balanced operation of videoconferencing system was achieved. The system is locally managed and

physically located within the country. By means of this “on-premises” service the ASNET-AM network provides an effective solution for different science and education organizations of Armenia to assist in organizing the online work and educational processes.

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