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# Remote access for personal cloud devices

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## Abstract

With the developments in cloud computing, there have been raising concerns towards the privacy of content stored in the cloud. People tend to steer towards personal cloud devices as they improve the locality of data by holding such cloud devices in the vicinity, in order to ensure data privacy. These devices are mostly found in the form of Network-attached Storages (NAS) that are accessible within the local network. Although there are gains in security and privacy, numerous drawbacks exist among personal cloud devices when compared to cloud-based solutions. One major drawback is the remote access to content and sharing of content with remote users. A popular method of sharing media to remote users is the generation of a link, which is globally accessible through a centralized server. The proposed solution implements a link sharing mechanism, an online cross platform file browser and a remote access control mechanism which uses end-to-end encrypted tunnels to communicate in a peer-to-peer manner. This solution makes use of WebRTC which utilizes Datagram Transport Layer Security (DTLS) to ensure encrypted delivery of data. The presented text contains the experimental setup, user interfaces and results obtained after evaluating the performance of the proposed system.

**Keywords:** Cloud computing, Remote access, Personal cloud, Security

## Introduction

The concept of cloud computing has influenced human life in many forms. Media storage is one of the most popular cloud services. *Google Drive* (Google Drive, 2018) and *Dropbox* (Dropbox, 2018) are two famous solutions which provide storage facilities in cloud. Although the provided service satisfied many requirements of cloud storage, there is a raising concern towards the privacy of such solutions. In fact, *Google Drive* (Google Drive Terms of Service, 2017) uses customer data to perform analytics and *Dropbox* (Dropbox - Terms, 2016) employs deduplication mechanisms in order to improve the performance of their services. In order to satisfy certain use cases such as synchronization without using online cloud services, solutions such as *Box2box* (Lareida et al., 2013), *Resilio Sync* (Forums - Sync Forums, 2017) and *RSync* (How Rsync Works, 2018) have emerged. *Resilio Sync* and *Box2Box* are two peer-to-peer synchronization services. Even though they support synchronization, no web-based remote access facilities are provided. In contrast, *RSync* provides synchronization only when the devices are physically connected.

The presented solution utilizes peer-to-peer networking technologies within personal cloud devices to provide improved remote access in order to compete with existing cloud service providers. This is achieved by enabling web-based file browsing and globally accessible link sharing. Performance measures demonstrate the performance of the proposed system with competitive scores against that of well-established cloud service providers while maintaining a similar user experience. Furthermore, with the utilization of DTLS via the adoption of WebRTC as the transport layer technology, all the communications related to file transmission are secured end-to-end.