

# Wuala - Social Online Storage

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**Abstract**—Wuala is a free social online storage program, which allows its users to securely store, backup, and access files from anywhere and to share files easily with friends, groups, and the world. Over 70'000 users (Nov. 2008) and thousands of communities around the world are actively sharing millions of files and these numbers are growing quickly.

Wuala is based on a revolutionary technology that was developed for the most part at ETH Zurich (Swiss Federal Institute of Technology). Users start with 1 GB of free storage but can get as much as they want, either by trading their own unused disk space or by buying additional storage. All files are encrypted before they leave the users' computers and the users have full control over who can access which folder. No one else - including us - gets to see the files. Wuala comes as a convenient application for Windows, Mac, and Linux that can also be started directly from within a Web browser, thus, elegantly bridging the Web and desktop.

Wuala is developed and run by Caleido Inc., a start-up based in Zurich, Switzerland.

## I. OVERVIEW

We all own increasing amounts of digital data on a number of devices. We want to access this data from anywhere, we want to backup this data, and we want to share part of this data (e.g. photos, videos, or documents) with friends, family, co-workers, and among online groups.

Online storage is the solution to these problems. The data is reliably stored in 'the cloud', making it accessible from anywhere at any time. Files can be shared easily among friends and in groups. The backup problem is solved as well, since the data is stored redundantly and reliably off-site.

Wuala is based on a novel technology: Wuala can harness idle resources from participating computers. Users can choose to trade local storage for online storage. One challenge we face is to guarantee high availability of data stored in the cloud. We overcome this challenge by using erasure codes. The data is first encrypted on the user's computer and then redundantly encoded into fragments, which are stored in 'the cloud' and on our servers. Our technology allows us to save costs for downloads (bandwidth, electrical power) and thus to provide

a better service for free. In addition, the users profit from many advantages, such as unlimited traffic, no file size limits, and fast downloads. When accessing a file, it is downloaded from up to 100 sources in parallel. Wuala uses a transport protocol based on UDP, which we extended with congestion control mechanisms to avoid penalizing TCP connections. Furthermore, we maintain a Distributed Hash Table (DHT) among super nodes in Wuala. Our routing protocol constructs a network with small-world properties to achieve highly efficient storage and lookup of fragments in the cloud.

Wuala uses 128 bit AES and 2048 RSA cryptography for data encryption and user authentication. A hierarchical key management system guarantees efficient operations for setting the access rights in the folder tree [1].

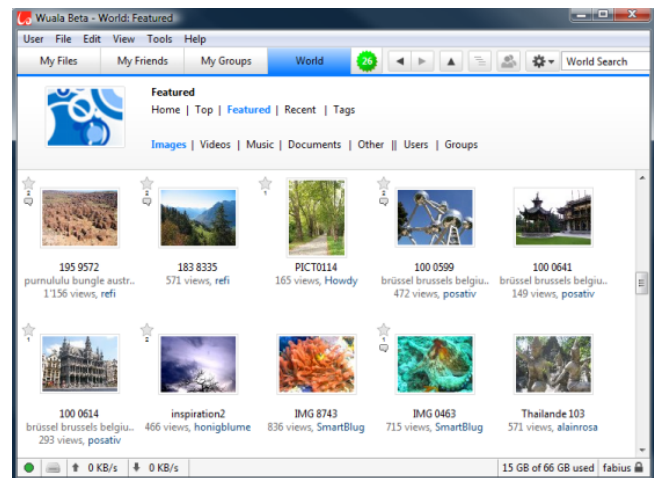


Fig. 1. The Wuala Graphical User Interface

## II. DEMONSTRATION

We will show a live demonstration of the Wuala beta version. It offers the main functionality of social online storage, such as upload and download of files, management of access rights, groups, tags, favorites, streaming of media files, and notifications. Figure 1 shows an example of the Wuala GUI.

We will demonstrate the group functionality by creating a 'Comsnets 2009' group, which can be used to share conference-related material, such as documents, photos, and

videos. An example for a group in Wuala is shown in figure 2. The participants of the conference are welcome to join the demonstration by signing up for a free account, joining the ‘Comsnets 2009’ group, and connecting to other users.

Furthermore, we will demonstrate, with the help of a network monitoring tool, how the Wuala client downloads large files from multiple sources in parallel (figure 3). We will also address the technology behind Wuala with a poster describing the major challenges in developing a distributed online storage.

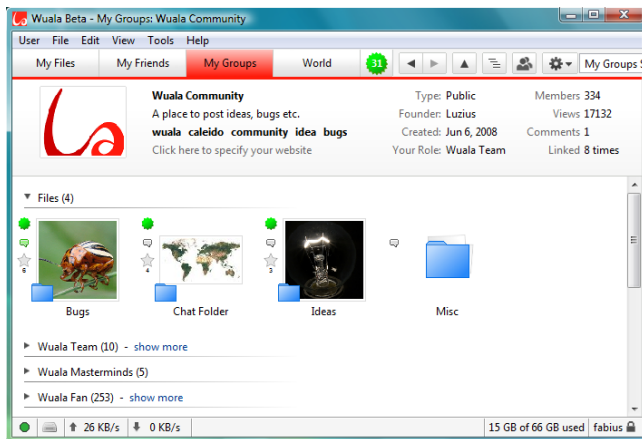


Fig. 2. Example of a public group: The Wuala Community group

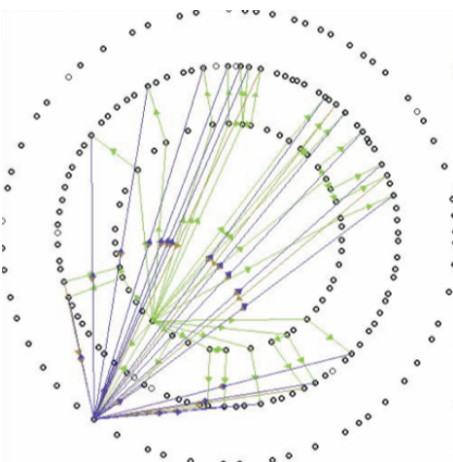


Fig. 3. Parallel download of fragments: Clients (outer ring) request multiple fragments in parallel. The requests are routed in the DHT (inner ring) to the responsible storage nodes (middle ring), which directly return the fragments to the clients.

### III. FURTHER INFORMATION

- Beta version of Wuala. Available on our web site: <http://www.wuala.com>
- Google Tech Talk explaining Wuala’s technology: <http://wuala.com/en/learn/techtalk>
- Screenshots: <http://Wuala.com/files/screens.zip>
- Publication on management of access rights: Cryptree [1]

### IV. REQUIRED EQUIPMENT

- Power supply, projector, Internet connection for live demo
- The demonstration will be supported by a poster giving an overview of Wuala’s technology

### REFERENCES

[1] D. Grolimund, L. Meisser, S. Schmid and R. Wattenhofer, *Cryptree: A Folder Tree Structure for Cryptographic File Systems*, SRDS '06: Proceedings of the 25th IEEE Symposium on Reliable Distributed Systems, Washington, DC, USA, 2006.