Secure Collaborative Editing over Low-Cost Cloud Storage Services

Chunwang Zhang, Junjie Jin, Ee-Chien Chang
School of Computing
National University of Singapore

Sharad Mehrotra
Department of Computer Science
University of California, Irvine
Secure Collaborative Editing

Alice and Bob want to collaboratively edit a document in real-time.
Secure Collaborative Editing

Centralized Server setting.

Alice

Server

Document

Bob

24 June 2012
Secure Collaborative Editing

Peer-2-peer setting.
Server is honest-but-curious. Hence, we want to protect confidentiality of the document.
Server is honest-but-curious. Hence, we want to protect confidentiality of the document.
Bob carries out the editing session using different devices. Hence, Bob’s devices are “stateless”.

Different to be realized in peer-2-peer setting.
Low-cost storage service

Server provide generic storage services
(read, write, delete a file and directory listing)

- No server-side processes dedicated to an editing session.
- Low bandwidth, not guarantee on latency.
Our approach

• While the authors collaboratively edit the whole document, they seldom edit a small region concurrently.

• Relax the real-time requirement to “quasi-real-time”.

• Document are automatically broken into pieces. The client-side editor manages “locking” automatically and provides a quasi-real-time editing experience.
Implementation & experiment

• A Proof-of-Concept implementation over Dropbox.

• User studies shows that it is effective (70% of time required compare to turn-based editing) and efficient.