Open Source Collaboration Tools and Organisational Learning: On Adopting EtherPad in Small Companies

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Abstract. Organisations could benefit from the improvements in collaborative learning and increased control gained by the use of open source software. EtherPad enables simultaneous updates on a shared document from remotely located participants. We discuss the adoption life-cycle of this open source tool in the context of a strategic intervention, with a focus on a learning agenda to guide the installation and configuration processes, and to reduce the learning curve involved in the adoption experience.

1 Introduction

Many organisations have requirements for long-term maintenance of software systems and associated digital assets [5]. One type of software systems that is important for small companies revolves around tools to support collaboration between employees who may be geographically distributed over different sites. In some circumstances proprietary cloud solutions for collaboration (e.g. Google Docs and Office 365) may be inappropriate for use in a small company context for a number of reasons. For example, there are risks of being locked-in in various ways (such as file format lock-in, product lock-in, vendor lock-in, and contract lock-in). One means for mitigating such risks is to utilise open standards and open source solutions [4]. In this paper, we focus on how small companies can support organisational learning through the adoption of a specific open source tool (EtherPad) for collaboration between employees.

Over the past decade, many innovative small companies have realised the potential of engaging with open source projects and incorporated mission critical open source software as part of their IT infrastructure. Strategic use of open source software in small companies provides an effective means for maintaining control of software systems and business critical digital assets over long life-cycles [2]. The EtherPad tool (available at http://etherpad.org/) is one example of open source software, which provides means for collaborative creation and maintenance of documentation and notes when individuals are geographically distributed. By use of this tool in a small company context, it is possible to maintain control of sensitive

data on local servers within the company ecosystem. For some usage scenarios, it may be critical that data resides within the organisational context and that data remains within national boundaries.

The overarching goal of the study is to demonstrate how the EtherPad tool may provide a means for organisational learning and collaboration within a small company context. There are two specific objectives. First, we present a strategy for a planned intervention of introducing EtherPad in a small company context. Second, we illuminate how the EtherPad tool may be adopted and effectively implemented and used in a small company context.

2 Intervention Strategy

Open source tools offer a sustained business growth through the brainpower of broader open source communities and implementations of open standards. The potentially significant business benefits generated from immense cost-reduction are prompting small companies to learn about and adopt open source tools and cloud services. EtherPad is an open source tool, which incorporates features to facilitate collaboration through remote personal interactions. A planned intervention facilitates the adoption process through a learning strategy that increases the rate of EtherPad diffusion across coordination meetings. This strategy includes a major learning support element of both the tool and the collaborative knowledge when using it.

The proposed intervention strategy assumes a preliminary diagnosis of a business process addressed by the intervention [7], which consists in facilitating coordination meetings. The intervention needs also to be driven by potential improvements in the business process, which in our case translates into enhancing employee experiences with cognitive collaboration skills through EtherPad [1]. However, in this paper we focus on an action plan for the intervention, by rolling out EtherPad through a systematic installation process and a persuasive experiential learning activity.

3 Intervention Plan

Our approach to open source adoption in small companies is problem-driven to trigger the motivation for learning and embracing open source tools. In this section, we reveal the problem context followed by a suggested solution that integrates the EtherPad open source tool. We then show a design approach and list practical implementation steps to walkthrough the proposed solution. Finally, we present the tool in action along an illustrative business scenario to learn about using the tool in the suggested problem context.

3.1 Problem

Small companies are frequently faced with situations where coordination meetings bring together geographically distributed parties to brainstorm on a future action,

such as promotion, marketing campaign, or planning the development of a new product. Consider a Swedish company headquartered in Stockholm, which manufactures laboratory equipment that are further distributed via agents based in Gothenburg and Malmo, respectively. Distributors supply offshore customers in Budapest and Warsaw. Regular meetings are arranged by headquarter executives with distributor agents and sometimes customers as well to collect feedback and assess the market needs. The proceedings of each meeting are collaboratively elaborated and need to be recorded via an online shared platform that is privately hosted to avoid any leak of information to potential competitors. The final notes are published locally at the company's internal electronic space and made available in a secured environment. Archived versions are stored in plain text formats to be preserved digitally, which maintain vital links of the company intelligence into the past.

The need for true collaboration and snapshots recording of meeting proceedings prompt the adoption of EtherPad. The learning curve needs however to be smoothed out through a systematic instructional roadmap to set stakeholders to speed, and reduce operational costs. In doing so, stakeholders also discover the benefits of collaborative learning and the merits of collective decision-making.

3.2 Solution

The proposed scheme suggests combining an online teleconference application with a collaborative notes-taking open source tool, namely EtherPad. A preliminary meeting agenda document is set out by the management executives to discuss the functions involved in fulfilling customer requests in terms of product development, marketing, operations, distribution, finance and customer service. In this business scenario, roles are attributed to the meeting participants to intervene freely and contribute to the meeting with real-time contents and within designated sections of the shared agenda document. As information flows across the shared document driving market reflections from distributors and selected customers, management decisions are drawn from a dashboard-like platform that is correlated to the supply chain profitability.

3.3 Design

The advent of cloud computing and open source platforms spawned a suite of low-cost evolving software and platforms. As an alternative to using the public cloud however, a private configuration may be prevailed. Our intervention strategy in this paper promotes a platform for content sharing and development to facilitate a private virtual collaborative workspace among participants in coordination meetings. This approach expects a host server application to be installed in a computing node from which EtherPad services are made available to selected consumers. This is how a meeting is initiated in our problem context, where all meeting data are actually recorded in a local host server. Fig. 1 shows a high-level architecture of this configuration.

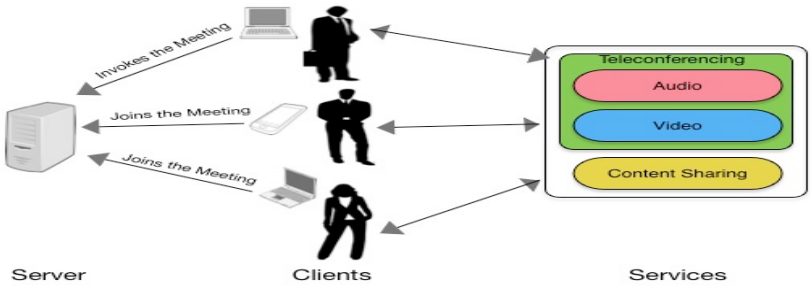

Fig. 1. Collaborative workspace

4 Implementation

To implement the design solution for the collaborative meeting described earlier, EtherPad is used as content sharing platform. EtherPad is an open source tool, which provides Web based pads for real-time text-based group discussions. EtherPad comes out of the box with a pre-configured database and SSL support. The pre-installed open source database management system (DirtyDB) can handle up to one million records. Beyond this threshold, and for further production use, the MySQL open-source DBMS is recommended. The migration from DirtyDB and the configuration of MySQL are facilitated by the highly configurable options provided by EtherPad. In addition, EtherPad is installed from the latest version of the upstream GitHub repository to ensure consistency with released updates and patches.

As shown in Fig. 2, EtherPad interface embeds a chat window that is visible to all meeting members. The toolbar offers a range of functionalities including formatting and scrolling back across time to visualise past snapshots of the meeting notes. There is no particular authentication process to participate in the meeting. Instead, the meeting link to the shared pad is distributed among relevant parties only. The implementation process is mainly handled at the server-side that hosts the EtherPad service. This one-time process makes the open source tool available for private use among all meeting attendees. Next, we reveal a systematic step-by-step installation guide to setup EtherPad. Further details about this process can be found in: https://github.com/ether/etherpad-lite/wiki and http://blog.etherpad.org.

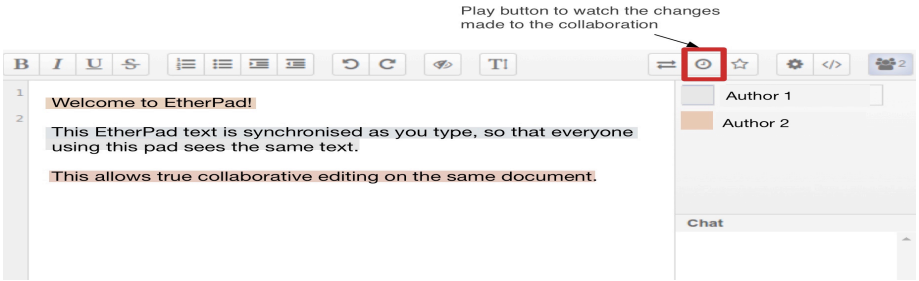

Fig. 2. EtherPad interface

4.1 Server Installation

The installation instructions listed in Fig. 3 assume a dedicated server. However, a private cloud server option is possible using open source virtualisation technologies available through the CentOS project [6]. In either case, the server installation process requires a prior library package and a bridge with the EtherPad original repository to sync the installed version with remotely released updates.

Step 1: Install Node.js This server-side JavaScript package allows lightweight real-time data-push over Web sockets used to facilitate two-way connections among distributed pads. The package can be downloaded from nodejs.org, and then installed locally.
Step 2: Create a folder where EtherPad is hosted Since EtherPad is an open source tool, all development resources related to this project will be downloaded as well within this folder, including source codes.
Step 3: Clone the Git Repository The open source tool is downloaded from an open source version-control platform, namely GitHub. This approach bridges the local installation with the original project to ensure seamless updates. The following command creates a clone of the current version of the tool project files: `git clone git://github.com/ether/etherpad-lite.git` A new folder will be created with the name etherpad-lite. We should position the workspace within this folder using the command line before proceeding to the next step.
Step 4: Run EtherPad To start EtherPad service, the following command needs to be typed: `bin/run.sh` EtherPad could then be tested on the local machine by pointing the browser to the following URL: http://127.0.0.1:9001. Once EtherPad appears on the browser window, it indicates a successful installation of EtherPad as a Web service.

Fig. 3. EtherPad installation steps

4.2 Client Invocation

The Distribution Manager positioned in the head office at Stockholm would run an instance of EtherPad service to prepare for the meeting. This client request results in a new pad, which has a unique name to be shared among the other meeting attendees. The link to this pad is conveyed to the other parties involved in the meeting, who are remotely positioned. The URL to a pad is made-up of the EtherPad host address followed by the port number 9001 used by the server to listen to incoming EtherPad traffic. This URL creates a new pad. Attendees who join the meeting enter the same URL and then they are prompted to enter the shared pad name. All parties using this

URL will view on their browser a common pad space used for collaborating on the meeting agenda items using this link: `http://"Host server IP address":9001.`

4.3 Plugins

Although EtherPad could now be made functional, there is an exhaustive list of plugins that can enhance its capabilities. To access this list, we need to access the admin interface using the following URL: `http://"Host server IP address":9001/admin/plugins.` EtherPad will respond by requesting the admin credentials, which can be obtained and updated by uncommenting the "users" section of EtherPad configuration file "settings.json" located in the root of EtherPad folder, as illustrated in Fig. 4.

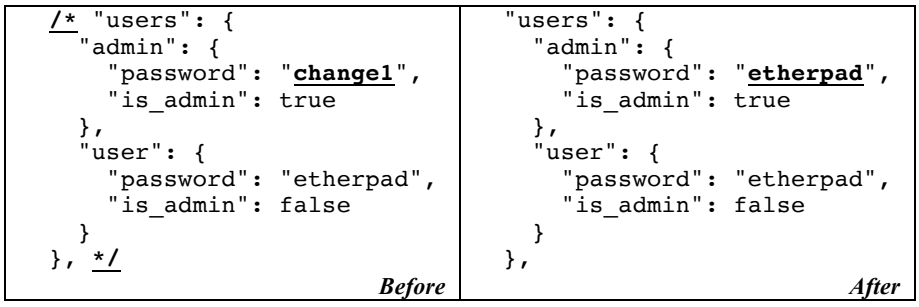

Fig. 4. Enabling "admin" user in EtherPad

This configuration amendment enables the access to EtherPad plugins interface with a given password (which in this case is "etherpad"). The plugins interface could be used to extend the capabilities of EtherPad. We would particularly install the toolbar plugin, which provides a menu style file toolbar shown in

Fig. **5**. The toolbar plugin reveals the file menu, which enables imports or exports of files to or from EtherPad in text, html or EtherPad format. The extension to proprietary document formats (e.g. DOC) and open document formats (e.g. ODF), can also be obtained with the installation of AbiWord on the local system, followed by a further adjustment in the configuration file (i.e. "settings.json"). This configuration amendment consists in replacing the command line: `"abiword": null,` with `"abiword":"/usr/bin/abiword"`.

The plain text export option could be used to maintain an archival duplicate of data generated by EtherPad, for digital preservation purposes. This ensures a sustainable access to the information in archived documents.

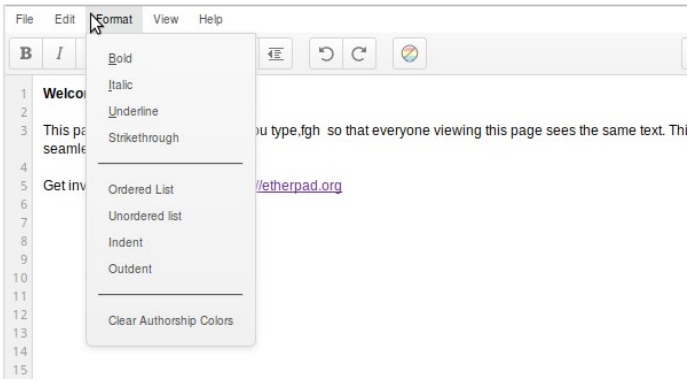

Fig. 5. Menu style toolbar plugin

4.4 Scenario

We elaborate a scenario for organisational implementation of EtherPad in which market changes dynamically prompt a company to review its distribution channels regularly to respond to customer needs. A coordination meeting initiated by the head office of a small company based in Stockholm sets an agenda for this purpose. The feedback collected from neighbouring Gothenburg and Malmo agents reveal a new strategic move to optimise the company distribution channels, as illustrated in Fig. 6. The colours distinguish intervening parties and the critical decision is built collaboratively.

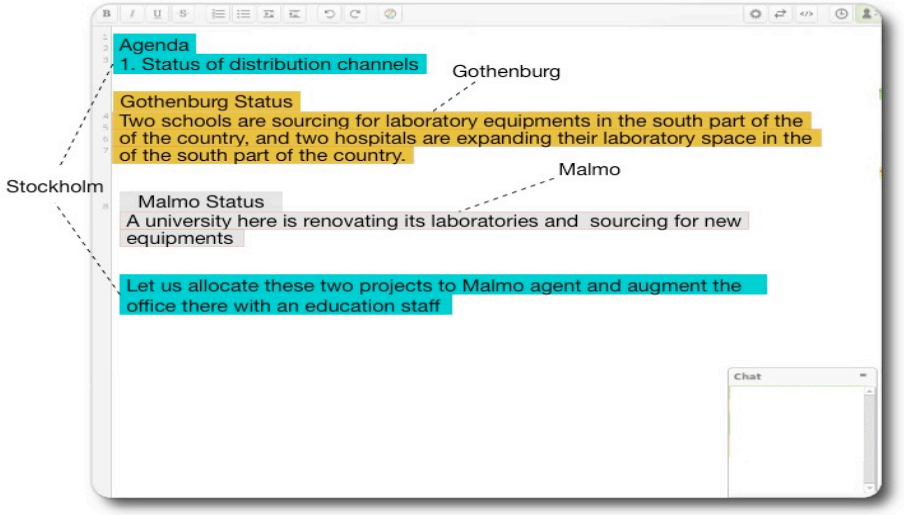

Fig. 6. EtherPad in Action

5 Conclusion

We have presented an intervention approach to drive adoption of an open source tool in a small company context. We also revealed a rollout plan to assist the adoption process by addressing a recurrent organisational need pertaining to collaborative learning. The intervention approach and rollout plan proposed in this study promote technology transfer from open source communities. We find that important implications for practice are that the adoption of an open source tool aid organisational learning, and that organisations gain control of business critical software systems and associated digital assets. Furthermore, we conjecture that an organisational implementation of the open source tool investigated could empower companies to collaborate on the creation of common assets that they can jointly use in product development. Finally, an organisational implementation which involves engagement with an open source project may be strategically benificial for a company as they adopt the work practice of contributing to the open source community. Hence, such a practice will also be beneficial for the broader open source community and promote learning amongst those involved.

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