

Tomorrow's email: DLM 3.0 Project' vision for the future of email in enterprises

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Abstract — In this paper we present the DLM 3.0 project's vision for e-mail communication in enterprise. The project promotes the use of semantic techniques, based on case studies and ergonomic analysis to improve current email tools, in an enterprise context. The project's realm is to create a corporate social network centered on email, with email being connected to the company tools, and automatically interacting with them. In this paper we describe the in situ study of email usages we performed to identify both human factors and technical limits of current messaging systems, personal information management and work-flows. Then we describe the features we developed towards a corporate social network and the next steps of the project.

Keywords—component; semantic e-mail; productivity; e-mail usage; electronic messaging;

I. INTRODUCTION

The DLM 3.0 project started in December 2009 as part of a French public initiative in the digital communication sector. The project is funded by the DGCIS (Direction Générale de la Compétitivité, de l'Industrie et des Services). and involves a consortium of four organizations, mixing expert companies in email solutions (Alinto, leader), NLP processing (Kwaga), public laboratory specialized in data mining, visualization and interaction (LIRIS) and a test partner (APCE). More details on the consortium is given in the last section of this article.

Even if the email looks deprecated in favor of other tools in the personal information management and communication context, it is still widely accepted and extensively used in companies [1]. The project's focus is on this kind of email, called *corporate* email. This subset's main characteristic (compared to other ones such as marketing email or personal communications) is that it must remain personal, since it may hold sensitive information about businesses or markets.

The project's goal is to improve users' experiences around email which we think is still an efficient tool for spreading, collecting and organizing information. Email's strengths rely in an open and standardized communication

protocol, a decentralized architecture and the ability to implement or use any type of client to check and send emails. The basic requirements are a domain name, a mail delivery system and a client. As a consequence, it is not necessary to register to a community to exchange emails. Also, email system is not subject to any terms of use changes as may be proprietary, centralized social networks [3].

II. E-MAIL USAGE STUDY & DLM 3.0 GUIDELINES

A. Preliminary Email usage study

We collected and processed email usages in three steps:

1. Open interviews *in situ* with APCE's employees, Alinto's clients and colleagues at LIRIS and Alinto (i.e. qualitative study);
2. A large scale (national) questionnaire (i.e. quantitative study);
3. Analysis of one-year communication graph from APCE.

In particular regarding the questionnaire, it has been sent to both companies and research labs. We collected 546 answers. Results [5] shows mainly:

1. There is no clear separation between personal and professional communication;
2. Users don't have a particular workflow when dealing with emails and tend to mix information;
3. Users don't change their habits, even if they get overwhelmed by lots of emails. Meaning their habits don't scale well and they don't make any effort to improve them.

Preceding and even very early usage studies showed similar results [4]. In particular that emails is not only dedicated to personal communications, but also to file transfer and backup, to organize meetings and for project planning and monitoring.

B. Guidelines

After the usage study, we identified a series of recurring requests from users (we'll later call them *guidelines*) that we think should be kept in mind when testing and deploying new features. These guidelines should allow innovation to smoothly infiltrate users' environment, without imposing counterproductive constraints. We try to follow them at best during prototypes design and implementation. The guidelines are as follow:

- *No intrusion*: no modal windows, no focus inconsistency.
- *Be didactic*: clarify email related operations and information, in context; make them intelligible, rather than hiding them.
- *Simplify*: less clicks, minimum data input.
- *Interoperability*: interconnecting and unifying tools that are already in use (email accounts, SMS, fax...).
- *Freedom*: nothing fully automatic, only semi-automatic behavior. Always let the user decide, even with only one click, to trigger the feature or not. We nevertheless try to calculate best suggestions based on the available data and best defaults when data input is needed.
- *No changes by default*: the user has its own habits which allow him to be effective and confident in his work, we do not change his application interface or behavior without his explicit consent. We rather give him suggestions.
- *Messaging system only*: access to features should be inside user mail application. No need to open another application.
- *E-mail as a development platform*: we expect to deploy and experiment our features on a lightweight client, such as the Alinto's webmail¹. This platform benefits from the engineering expertise and maintenance from the project's partner.

C. Directions to explore

Following our preliminary studies on e-mail in professional context, and in respect to our guidelines, we choose to explore three main directions:

1. **Fighting e-mail overload**: no matter how many e-mails par day people receive, users unanimously complain about the large number of e-mails in their inboxes and incoming ones.
2. **Beyond the personal inbox: sharing through e-mail**: professional e-mails tend to become a kind of workflow: tasks, important information, meeting requests, new contacts... our inbox can be seen as an activity flow of our work. Can we think the next e-mail generation as a collective tool in which each user fills in e-mails/contacts/tasks/events whenever he wants to share information or responsibility with their colleagues?
3. **E-mail as information database**: retrieving, organizing, extracting information in e-mails.

Beyond those directions, we in DLM 3.0 explore ergonomic and design issues in messaging solutions. In particular, we tried to have a new insight on webmails by, first, designing a person-centric messaging UI, and second, renew the mail/thread concept in proposing a mail digest notion to represent a set of e-mails.

D. Features

The directions have been explored and declined into features. We prototyped some of them, others are only at still at a mock-up or discussion stage, yet. Here is the list of features. They will be added to Alinto's webmail².

TABLE I. FEATURE LIST SUMMARY

Feature	Description	
	Webmail only	Status
Anti-attachment	Yes	Test
Automatic rule suggestion and rule sharing	Yes	Discussions
Address book updating and sharing	No	Test
Internal yellow pages & corporate signatures	Yes	Specifications
Similarity search	Yes	Test
Sharing conversations	No	Specifications

1) Anti-attachment

Attachments are the heart of many problems, mainly related to files size. For instance, a heavy attachment may be blocked at sending, forcing the user to find other means of transmission. It can also be blocked on recipient's server,

¹ A free version of the wemail is available at <http://www.inmano.com/login/>

² <http://www.alinto.com/web/guest/webmail-caracteristiques>

with no way for the sender to know it. Furthermore, on the infrastructure level, an attachment sent to many recipients will be duplicated many times, increasing redundant disk usage.

This is the type of issues addressed by this feature: it simply offers the user to convert his genuine attachment into a link pointing to his file stored online. The very innovation here is to offer this possibility in one click, right within the e-mail edition screen. The suggestion appears as a headband featuring a button which triggers the conversion. The banner appears at the top of the edition area, when a large file is attached. The user can ignore it if wanted.

A very promising extension of this feature would be the connection to an existing DAM (Digital asset management software), allowing, besides simple file storage, version control features; for collaborative editing for example.

2) Automatic rule suggestion and rule sharing

Rules are very useful to deal with email overload but largely unknown by most users. We foresee two scenarios: first, a single user receives various bac'n-type e-mails. We detect recurrent subject or originator pattern and suggest the user to add a relevant rule. The second scenario would be to detect a collaborative pattern in colleagues' communication (e.g. starting a new project) and suggest a specific rule (and good practices) to archive and share e-mail concerning that specific new project.

3) Address book updating and sharing

a) Contact detection

Thanks to Kwaga's NLP analysis of e-mails, we are able to analyze emails within Alinto's webmail and to automatically extract sender's signature in a Visit Card format (vCard). The extracted information is handled through the user interface, which offers several options to add or update the contact information in the user's address book.

With this one-click feature, one might convert textual signature to his/her address book, without leaving the message screen and thus keep his/her address book up to date while dealing with e-mails.

b) Contact sharing

Contacts are much valuable in enterprise context and we thought it would be important for professional users to have sharing features for contacts. Such features already exist but we thought, thanks to DLM 3.0 guidelines, that it would be much more user-friendly inside the messaging system than in another app (e.g. CRM) that most users don't know about or use.

We plan to integrate 'New Contact Added' flow in corporate webmail to signal enrichments to common contact

database. Integrating such information promotes sharing within the company, by rewarding the user, and reveals the email's inherent social network: email is the first social network, used to share and communicate.

4) Internal yellow pages & corporate signatures

Signatures are widely used in corporate e-mail but it's often exhausting to change corporate signature for every employee in a firm or when somebody arrives in the company. The feature would simply be, for each collaborator in the company, to be able to edit their own contact details, keeping it up-to-date easily, and generating an up-to-date signature easily, based on a shared corporate template. For system administrator, sharing corporate image and details through employee signatures (new address, new logo...) would also be easier if such yellow pages existed and were updated for everybody when necessary (e.g. extracted from a central LDAP repository).

5) Similarity search

Inherited from the 'Query By Example' search strategy, the similarity search feature aims at helping user to find a specific e-mail that do not contains the actual keyword he searched for: for instance, while preparing a meeting, several people exchanged e-mails about this event and finally choose a name for it. Those first e-mails will not be retrievable with the meeting name, but would be with the similarity search feature. Classic scenario would be: a user searches for a keyword (say, the event name), selects a relevant e-mail in results list and asks for similar e-mails. The new result list would display e-mails wrote by same correspondents (or part of), around the same dates and containing at least one of the initial e-mail subject word in the body. E-mails would be ranked by a scoring function.

6) Sharing conversations

E-mails are often considered as personal data, but should be shareable in a company (or a team) context: for example, one needs to know quickly what happened with a specific customer to be able to handle a project if the person in charge is out of office, for instance. Shareable conversations would save much time spent in forward, explaining, reminding a customer history, etc.

Sharing conversations could also be helpful to share information within the company with people having same interests: rather than send links by e-mail to all@yourcompany.com, increasing e-mail overload, one could share it via a shared repository 'Interesting stuff', that would free individual inboxes.

III. FORECAST

Our next step is to iteratively implement the features into the webmail, and test them at our test partner. Our early design iterations showed us the importance of testing with *personal* emails and with *real* scenarios. While email datasets are available online (Enron, etc.) *personal* emails are more difficult to collect, to evaluate and especially to share. This last point came out frequently while discussing with our test partner because even if beta-users were willing to dump their entire INBOX for the project, then it was difficult to share the results since data from tier users were in it. But the reward in using personal emails is that they engage users' attention more quickly and they can really evaluate the benefits (if any) of the feature.

Some features will be directly available on the webmail; others will be embedded within messages (signatures, etc.). The former are client-dependant and require specific developments which are not always even performed by major companies (GMail and Outlook for example). Modular email clients (Thunderbird, Outlook, etc.) ease the development and deployment, and updates are done semi-automatically and don't require any administrator action. So far, the features implemented on the webmail exclusively run on it, but may be later available as a web service.

Our long term prediction for emails is an integrated email processing user experience. It means going one step further the current features, and thinking globally how to assist the user in solving a task, rather than using a tool, such is the email client. Today's contextualization techniques offer integration by aggregating data from multiple source and present views and actions (calling, adding contact, etc.) to users. However, switching applications is required to communicate to Skype, Twitter, or generally to browse a web page, while users should focus on the email client. Advances in text-to-speech (and speech-to-text) may benefit to reach this level of integration.

Another lead in order to develop interoperable features, is through the extension of IMAP standard (RFC 3501[6]). Enhancing IMAP could allow, for example, to store rich meta-data beside messages : contacts information, user's interactions (messages' move...), related data gathered by the client, and generally a large set of data about the message's life after its reception.

IV. AUTHORS

Alinto provides messaging solutions (email, fax, SMS and interconnection of the three) for 10 years now. The company has over 4,000 customers in 5 countries in Europe through a network of 100 partners for a total of 1.2 million users. <http://www.alinto.com/>

Kwaga offers innovative semantic analysis software solutions to facilitate the management of e-mails by automatically identifying key information inside messages with NLP methods. <http://kwaga.com/>

LIRIS Lab (Computing Laboratory for Images and Information Systems) UMR CNRS 5205 has about 280 people including 110 researchers around two thematic departments "Image" and "Data, Knowledge, Services". The LIRIS has four guardianship: INSA Lyon, Université Claude Bernard Lyon 1, École Centrale de Lyon and Université Lyon 2, and sites at LyonTech La Doua, Ecully and Bron. <http://liris.cnrs.fr/>

Finally, The **APCE** (Agency for Business Creation) offers information and support to entrepreneurs since 1996 and is the test partner for the DLM 3.0 project. <http://www.apce.com/>

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