Communication Environment for Small and Medium Enterprises

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Abstract

This paper deals with description and suggestion of an appropriate communication environment to support cooperation between large number of small and medium enterprises (SME's). Goal of my work is to make communication between larger number of subjects as effective and transparent as possible. From a certain degree of complexity of the project communication becomes very confusing and therefore there is a need for appropriate and affordable solution for SME's. Proposed communication environment works on e-mail client basis. It is focused on transparent and effective communication between unlimited numbers of interested subjects.

In the new communication client all solved projects, tasks or problems are transparently separated. Each project has its own directory branch where all messages regarding the project are stored. Current problems and tasks are clearly separated from the already solved ones. This significantly sorts out all the information about finished projects and the whole actual communication becomes more transparent. All users with sufficient rights can trace the state of the process. For example who already read the message, if particular person responded to the message or how long it took to a particular person to respond to the message since reading it or receiving it. All messages are therefore traceable and it is simple to find out who is responsible for any delay of response and as a matter of fact a delay of the whole project.

This software solution gives the managers in SME's simple but strong tool for controlling and managing the communication.

Keywords: Virtual enterprise, communication, communication environment, communication software design
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1. INTRODUCTION

The cooperation of several companies on one-off projects such as R & D means a collaboration of a large number of users across a number of totally different business entities. There is none or very minimal possibility that these different entities will unify their enterprise information systems for the short-term cooperation. In the long-term cooperation the idea of unification of corporate information systems in terms of return on investment is also very controversial. Therefore the start of cooperation is threatened by the absence of

an effective way of information and data exchange.

Another important question in this concept is traceability and relevance of communication. In terms of trust it is essential that each of the entities is able to monitor and store the communication. That allows reverse analysis of communication back in time.

However, the possibility of reverse analysis is again in terms of cooperation of more SME's inadequate. It is all about quickness, quality and price. Therefore it is necessary to monitor communication and the states of processes in real time. That allows clear identification of problems and greatly eliminates wasting of time in communication. At the same time, there is evident who is responsible for the waste of time and who will bear the all potential consequences of possible unobserved deadlines. The Ability to monitor communication also applies for the customer who ordered the project. He is therefore given the ability to monitor the state of the communication providing assurance on the progress of work on his projects.

Effective communication environment for affordable price to small and medium-sized enterprises (SME's) are currently on the market only in very limited quantities. There are already existing similar sophisticated massive server-based communication environments or in a smaller scale, electronic forums. However, these solutions require a central server where all data are stored. Paradox is that the concept of communication through a central server as a data repository is very secure and still it meets with the considerable reluctance of companies to store their data on a server which is not directly under their control.

Proper communication environment is supposed to integrate transparently all communication channels available in the company. It is vertical communication, diagonal communication and horizontal

communication. Fig. No. 1. In inter-firm cooperation is mostly used horizontal and diagonal communication.
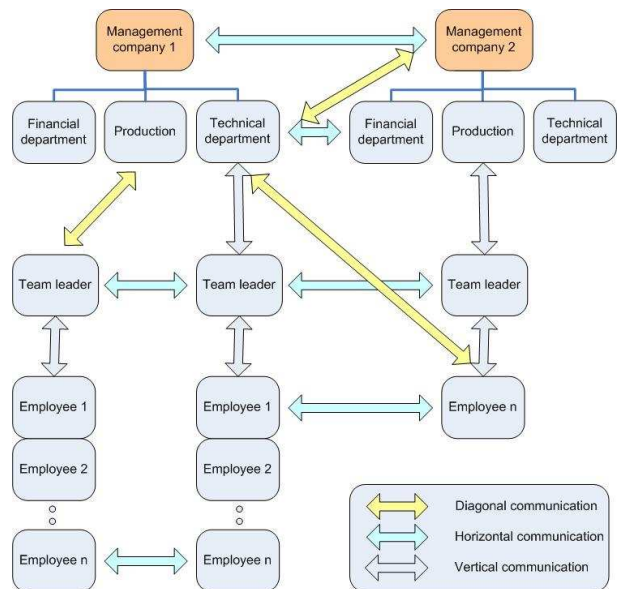

Fig 1: Inter-firm communication

Vertical communication – is fundamental communication inside the company. In the hierarchical structure of the company the information flows from the top to the bottom and the other way around.

Horizontal communication – is communication on the same level, essential in a day to day work, between cooperating employees.

Diagonal communication – is often used in the inter-firm cooperation, where management of one company directly specifies its orders to employees of other company, working on the contract.

2. MAIN REASONS FOR USING THE NEW COMMUNICATION ENVIRONMENT

People interested in the project and their ability to communicate with each other effectively, is a critical factor for success of

the project. Communication between these entities is a source of information and data, which all participants need for being able to work effectively. Therefore the communication is strongly correlated to the performance. Nowadays there is a significantly increasing pressure on the speed of communication, transparency, relevance and volume of data transmitted.
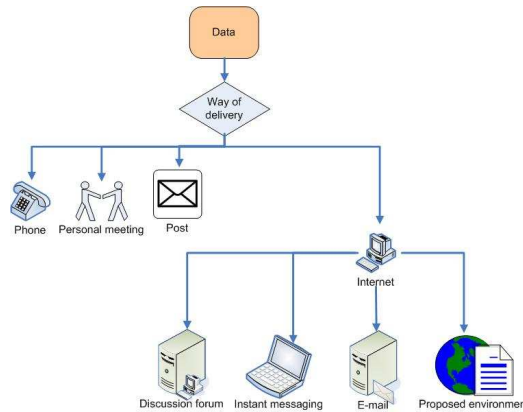

Figure 2: Communication ways

Telephonic communication is mostly used only between two people and therefore it is not effective enough in this concept. It is also unconvincing. Personal meetings are also ineffective because of geographical location of possible partners. The most used method in this branch is e-mail. This method in its simple way is very limited concerning transparency and deductibility. Sometimes communication is solved by software solutions which are too massive, sophisticated and expensive therefore not suitable for small and medium enterprises. From a certain degree of complexity of the project, communication becomes very confusing and therefore there is a need for appropriate and affordable solution for SME's.

For example when addressing the task some problem occurs. In the ideal case, all interested users are informed. This method has already shortcomings as for example every worker in is not well aware of whom exactly he should contact trough the whole network of SME's.

Another problem is the feedback element in communication. It is necessary to ensure the work and progress on the particular task is known by all users and therefore the unnecessary duplication of work is avoided.

Chain communication | Direct communication | All conections

| | Project manager | | Team manager | | Employee |

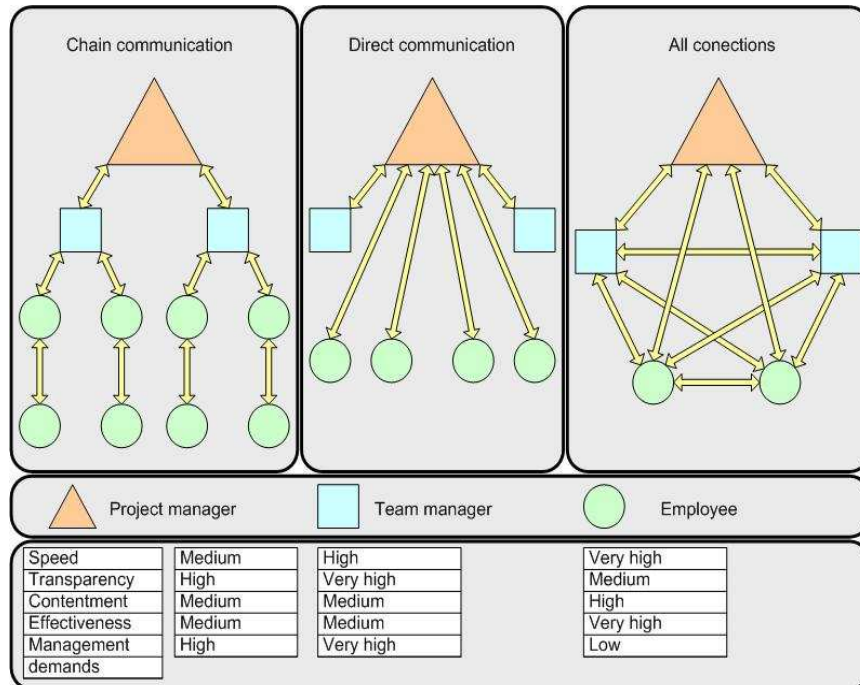|	Chain communication	Direct communication	All conections
Speed	Medium	High	Very high
Transparency	High	Very high	Medium
Contentment	Medium	Medium	High
Effectiveness	Medium	Medium	Very high
Management demands	High	Very high	Low

Figure 3: Communication networks in the company

It is possible to see on fig. No.3. that there are many types of communication network in companies. Goal of proposed environment is that all messages have to reach every involved user. Therefore all connections communication network model was chosen. When any user opens a message then another message with time stamp is automatically generated and send to all users. At the first sight it looks like senseless overloading of communication channels and making communication less transparent but the opposite is true. By automatically generated messages we can keep track of all information about times and state of the process. By sending information to all involved users we are making sure that all participants on the project have access to all information. Client is able to sort the messages easily and transparently to the pre-constructed address structure because of the unique encrypted code.

3. COMMUNICATION ENVIRONMENT

Proposed communication for business communication network is made up of two basic functional units providing the following features.

3.1 The communication and information exchange:

3.1.1 CREATION OF CLEAR REPORTING STRUCTURE.

The basic requirement for the communication environment is the maximum transparency of the information exchanged. This is achieved by using a suitable sorting and storing messages in lucid directory tree. It can be said that appropriate structure of the messages is the base for transparency of all communications. If one takes a classic email client, where the

messages appear in a directory beneath another, when the number of messages crosses more than two pages the clarity of communication is minimal. User loses an overview of the reports, e.g. which message is from what project and it is very difficult to determine exactly from what report it is only from the subject or sender.

In the proposed environment, the report classifies the directory tree according to the content (belonging to a particular project). This directory tree can be defined by any user who establishes a new topic. Therefore the messages are then sort to the pre-made directory structure, thereby ensuring their appropriate classification. Topics (directories) and messages not directly related to the user he does not have to read and on the other hand, reports of one subject are all stored in one place. There directories in which some new message was added are colored. Different color is used for example for the directories of unread message or of user-selected themes.

The following example is showing the directory of invented tree. Communication can be divided into directories, which can contain an unlimited number of subdirectories and their messages containing text are the last degree. The example shows that Project 1 contained three tasks that had to be addressed and solutions had to be discussed or reported. In addressing task 1 were two problems that had to be managed. Messages are automatically stored in the allocated space. Therefore if the user does not have to deal directly with the task No. 1 he does not have to read the reports appearing in other directories. If the user deals directly with this problem, he will immediately know that a new message appeared in the email comment on this topic. Alternatively, if there is a need to invite another user to help to solve the problem 1 in task 1, this user will be given the availability to see only the communication about task 1 or for the problem 1.
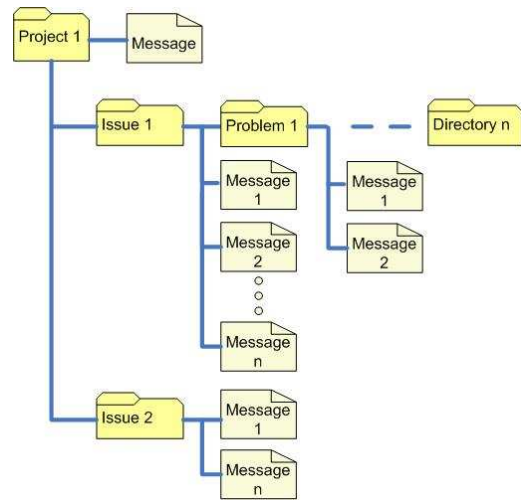

Figure 4: Directory tree

3.1.2 ENSURING THAT MESSAGES WILL GET TO ALL INTERESTED USERS.

Cooperation in a large number of users from different business entities on the same project is another problematic point of ensuring that all reports and relevant information received to all interested users. This is problematic because not every user involved in solving the problem, knows exactly whom in the network he should contact specifically. Another problem coming into play is the human factor. E.g. failure to add the address to the copy, or ignorance of a particular address. Because of this, it often happens that the information does not reach all of the interested users.

This problem must be solved in the proposal, this problem is addressed in such a way that the user himself does not fill in the address field.

If the user wants to reply in a specific location of directory tree in the debate, the client software stores directly in itself information about what users have which rights in the directory tree, and accordingly it sends the message to their email account. To avoid congestion of user's email accounts generated by the client software, each such

report shall contain the generated four digit code that are used to set filters by conventional mailbox. Therefore in the classic mailboxes folder there is created a new folder by using filters and then all the messages generated by the client are saved there. This method clearly separates the message generated and sent by the client from other communication. It can not be assumed that all communication will be via client software. And there must be said that the client software is required to create and send emails as well as serving its own synchronization and maintaining consistency of information on processing time. These information messages are still going trough the networks as emails but contain only a code string which is unreadable without the client. For this reason, the filter in a mailbox is recommended.

3.1.3 ENVIRONMENT ALLOWS IMPOSING REQUIREMENTS ON INDIVIDUAL USERS.

Due to maximizing of the efficiency of communication in the proposed environment it can be placed on each user's predefined requirements which they have to meet, confirm or reject. Examples of requirements: accept, approve, urgent response requested etc.

3.1.4 EFFECTIVE FEEDBACK.

Effective feedback is a problem again due to the cooperation of a large number of people on one project. It is important that the report on progress and work progress is given to all collaborators, this should prevent from waste in the form of redundant or parallel activities. Information is automatically sent as a copy to all users, so the procedures work on the project informed everyone whether they are workers or managers.

3.1.5 SORTING OUT OF ALREADY OUTDATED INFORMATION.

For easier navigation in incoming messages and to locate that information is already out

of date information should be some way sorted. In my proposal, this is done through distribution of the projects themselves respectively in two groups of subjects and current projects and archive. If the issue is finished respectively project is done than it can be moved to the archive. This is achieved by reduction of information that appears in the initial screen, current projects, and directory trees current projects are easier to navigate in them. In the case of the archive directory structure of communication it can not be easier but in this case it is not necessary. If you need to look for the information in the archive, it has clearly specified information so it can be traced. Thus, the archive of messages is not required the fastest possible but the completeness and clarity of the appropriate structure of information storage. Messages are stored to ensure completeness of information and project documentation. All data must remain compact for the needs of any reverse analysis or similar work on the project, which then can act as a knowledge base and thus significantly simplify the work.

3.1.6 REGISTRATION OF NEW USERS.

One of the advantages of the proposed system is that it ensures that information arrives automatically to all interested users. This is not possible without prior registration by the system. It is also important to ensure that the new user will get to know about already elapsed communications regarding the issues on which he begins to work. It will make it easier for him to orientate in the problem and gives him the information about the state of existing solutions. In this case, it is necessary to forward all messages already written in the topics to this new user.

3.2 ANALYSIS AND MANAGEMENT OF THE COMMUNICATION

Users with the right to have the power can monitor all the timing information related to messaging. This function is essential in order to prove the relevance and support fulfilling

of project deadlines. With the ability to see for example how long it took to the user to respond to the message the manager dealing with the communication analysis is then able to identify clearly who is responsible for the late response and thus a possible delay of the project. This function can be demonstrated as on of the pre-set functions of user requirements.

Two companies are working on joint project in research and development, first company deals with design and production of the device cover and the second one deals with the electronic parts inside the device. In the example should be mentioned that the second company has a limit for development of electronic products for 30 days. It is important to say that this development is controlled by company number 1, which is responsible for the delivery of information on time and for all the approvals. Thanks to this system it is clearly visible, for example, that the company number 2 sent the requirement for approval of scheme addressing internal parts the fifteenth day. In the system is then clearly seen that the report requirement left on the fifteenth day. Employee of company number 1 responsible for approving read it on the eighteenth day, and replied after four days. Therefore, if there was a failure to finish the project on time, due to the proposed environment it is very easy to identify who and how long was working on the project. In the example mentioned above the company number 2 was waiting for an answer for seven days and they should be therefore deducted from the final date of the contract.

In the case of the proposed client software this problem is solved by using an auxiliary email which leaves right after opening the message without the user knowing about it.

3.2.1 SPECIFICALLY, IT IS POSSIBLE TO MONITOR AND ANALYZE THESE TIMES:

When the user sent or received the message

This time is a normal part of email header.

When the user opened the message

In this case the client generates and sends supportive email in background for analysis purposes only.

When the user responded to the message

This time is also a standard part of the header of each message. And it is important for monitoring of how long users run their tasks on the project.

3.2.2 COMMUNICATION ANALYSIS IS PROPOSED FROM THREE BASIC ASPECTS:

From the perspective of specific message

There is a possibility to select a specific message and to visualize it in the table of two columns who and when read the message. It is possible to determine specifically which user and when responded to the message.

From the perspective of specific user

There is offered the opportunity to see in two tables, what message the user received, to which of them and when did he respond, or when the user created a topic.

From the perspective of a specific topic

User can view a specific topic and find out when and which user contributed to this topic or read this topic.

For the time analysis of the project Gantt chart is used. Users can mark important messages and visualize them in a Gantt chart. This chart can be made both in terms of individual users and the level of business entities cooperating on the project. Messages that appear in the Gantt chart can be manually selected to keep the chart transparent.

3.2.3 DATA IN THE COMMUNICATION ENVIRONMENT

In the communication environment possibility to save and export whole communication in appropriate format is required. This can be used as complete project documentation. It also creates a knowledge base, which is possible to use in the future.

Automatically there is a great emphasis on data security. During cooperation with various companies for example in the research and development organizations have to exchange classified information which can be very valuable.

4. SUMMARY

This paper is focused on basic description and presentation of design and function of communication environment that is primarily intended as a communication environment for inter-firm cooperation between SME's. In collaboration with managers from cluster initiative the software client is optimized for maximum efficiency in communication between the SME's. The proposed environment works on the principle of software client on individual workstations serving the appropriate e-mail account. All data are stored in the client's email account, which is mostly on the well-secured company's server. Therefore there is no need for a central server and transmitting data storage outside the corporate network. We are working on the possibility of integration of the client to MS Outlook. Application is developed in a programming language Java1.6, which allows usage and easy transferability between different operating systems and devices.

It is necessary to ensure the highest possible applicability in real business and therefore sometimes user friendliness and easy control is more important than the complex user functions. Interesting advantages of this concept comparing to the existing solutions are in the easy integration into the company, no need for the central server, high data security and support of large number of users. Also there is the possibility to transparently sort and track all the messages and perform simple time analyses. This simple and affordable software client provides managers with a relatively strong communication tool with the basic functions for analyzing and managing the communication.

ACKNOWLEDGEMENTS

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