ENHANCEMENT OF VIRTUAL TEAMS THROUGH SOFTWARE SELECTION: A PROPOSAL

Joiţa Alin-Cristian[1]

Abstract

The concept of virtual team gains importance in world economy as the process of globalization advances. This article presents the virtual team as a drive force through the improvement of the collaborative work processes. Substantial features are presented here, in regard to the assembly of the virtual team, the stages of its development and an empirical contrast analysis against the traditional team. In the virtual environment, an emphasis is set on trust, management and planning. These three objectives can be mainly acquired through communication and an accurate representation of the information. In an attempt to estimate the general software necessities required by a virtual team, a model is created that reunites a series of applications considered optimal for telework.

Keywords: Virtual team, software solutions, telework, project management JEL Classification L86, O14

Introduction

Europe is passing through a moment of transformation. Years of economical and social progress have diluted due to a shaky constitution, of the growing gap between image and reality of the world economy. For recovery, Europe 2020 strategy imposes three priority directions [10]:

- Smart growth –promoting knowledge, innovation, education and information society. A structure that supports this idea is the virtual business incubator, as shown in [3];

- Sustainable growth –promoting an efficient, competitive and responsible economy with a regard for the environment;

- Inclusive growth –sustaining a lower unemployment rate, anti-poverty measures and lifelong learning programs.

Network economy comes with solutions according to the strategy and inherently it produces changes within the collaborative work processes through technology and globalization. People active on the labor market can honor assignments from home, through telework, can work on several projects, for several companies simultaneously. Also, one can enter the labor market from another geographical area, normally not accessible without migration. In this way, local economic crisis may have a lower impact on the community if their members are in remote projects, located in areas with a better economical situation.

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[1] Ph.D. Candidate at the Academy of Economic Studies, Bucharest and assistant teacher at the Romanian-American university, Bucharest, e-mail: alincristianjoita@yahoo.com

The surface effects of telework are manifested through flexibility, saving resources and an increase in comfort: commuting is no longer necessary, the program becomes flexible, the company can minimize their physical office space or it can waive it altogether; Cultural, geographical and temporal differences tend to disappear. On the other side, limits between personal life and office life also thin.

Telework-based teams reside in a global, complex and dynamic business environment, therefore they have a high dependency on technology and the virtual environment, and they form and reorganize fast [2].

This article supports the virtual team as a proper solution for sustaining intelligent growth and lowering unemployment. The emphasis is in on the software that is used as communication, transfer and representation of information are key factors in the virtual environment.

The Virtual Team

According to the definitions found in [1],[2] and [4], the virtual team is composed of individuals with a common purpose, separated by time, space and organizational boundaries using as main means of communication the electronic systems. The team has a temporary nature, can be maintained only up to meeting the project goals, after which the members might never work together as a group again. Such a team involves discipline and a communicative, proactive character from the member's behalf.

In creating a strong virtual team it is necessary to be achieved certain stages: goal setting, clarifying expectations, setting the role for each member, team building, implementation of communication protocols and practices.

Goal understanding implies defining the mission, the objectives, the activities and the results. Clarifying these elements assumes more than just transferring them, a dialog must be initiated and clarity of understanding at both individual and collective levels must be obvious [4]. Changing objectives in a virtual team throughout the project should be avoided as the risk of confusion is greater than in traditional teams, especially in projects with tight deadlines.

In terms of technology, communication can take place synchronously or asynchronously. Synchronous virtual meetings involve a spontaneous communications, in which an idea cannot be attributed to a single participant, the communication content being a joined effort. The electronic systems for mediating the communication used in this case are phones, audio conferencing, videoconferencing, online chat applications in text/audio/video format, realtime applications for viewing and modifying documents and other derivates. If there is a need for a greater level of structuring communication, because of the complexity or large volume of information that needs to be processed, then the asynchronous type of dialogue should be applied.

Asynchronous interactions occur, generally, to exchange documents. Reaction time is greater and information cand be grouped in hierarchy, sorted by date and time.

Technologies used for this type of communication are the SMS, e-mail, document manager applications, the blog, the vlog, the forum, the ERP etc.

To summarize the differences, a table was created, with data mainly from [1], [2] and [5]:

Traditional team	Virtual team
-Teams with fixed number of members -Most team members are drawn from within the organization -Members are 100% dedicated to the team -Team members are in the same organization and geographical area -The teams have a starting and an ending date. -The team is lead by a single manager -Members communicate synchronously	-Teams with a variable number of members -The team includes members from outside the organization -Most members belong to several teams. -Members are spread geographically and organizational -The teams are formed and reformed continuously -The team has multiple hierarchical relationships inside the organization -Members communicate synchronously and asynchronously

Table 1 Traditional team vs Virtual team

Proposed Model

As said, the success of a virtual team is based mainly on the qualities of its members (from which begins trust and communication) and technology assumes the role of mediator of interactions between members [4]. In a well defined infrastructure, proper software applications empower virtual organizations, replacing most of the instruments from a traditional office.

To minimize expenses, the model focuses mainly on free versions of software or open source applications.

The instruments for the model were grouped according to their purpose: communication tools, presentation tools, project planning, business management tools, backup and centralized control of source code (code repository) and instruments for data backup. For each category an application has been presented and alternatives were offered.

Communication and presentation

Skype is one of the most popular VoIP communication tools aimed at replacing the traditional face-to-face dialogue. This software, according to [6] includes telephone services, chat and video conference. It is compatible with Microsoft Windows, Mac and Linux operating systems. All PC-to-PC calls are free. The application can interact with mobile phones through SkypeIn and SkypeOut features. SkypeIn allows accepting phone calls by allocating a globally accessible phone number to the user. SkypeOut permits to initiate a call to a mobile or a fixed phone subscriber for a small fee.
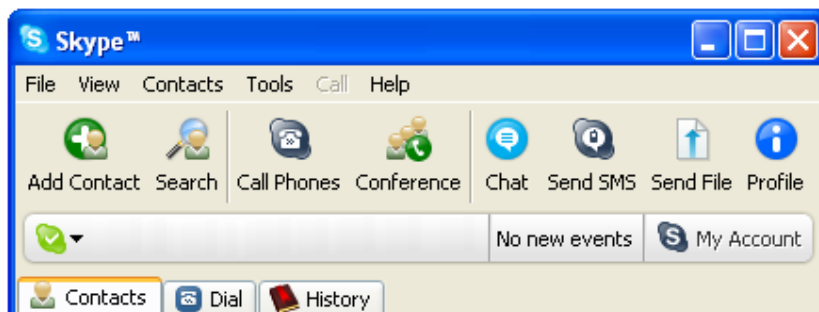
Fig. 1 – Optionbar - Skype

Another feature of this application is file transfer. Used for a small number of files, it can prove to be faster than the e-mail service. Also, the screen sharing module allows communication partners to view, screen captures.

Messaging component allows the user to send instant messages, SMSes, and direct feeds of information from the Facebook account. If installed on phones, voice and text communication become free of charge.

The Business version includes the option to join Skype community and control through SkypeConnect how team members are using Skype services.

Alternative to this application are less popular, with less options or more expensive: SightSpeed, Gizmo, Jajah, GoogleTalk, Yahoo Messenger etc.

GoToMeeting is analyzed from the presentation tools category. This is a paid solution that completes the virtual communication with real-time screen-sharing and remote desktop services. As it is presented in [7], this software is useful especially in brainstorming sessions, designing, training or by simply adding a graphic context to the message. Maximum number of users is 15, optimizing access for small groups.

The interface is explicit so the use is simple. Once installed, the application resides in the taskbar. When initiating a video meeting, a new virtual room is created through option "Meet Now...". Invites are being sent to team members by phone, email or instant messaging. One can share the view for the whole screen or just a certain application. It is possible to allow remote control for presenter's keyboard and mouse. Channel security takes place with SSL and AES on 128bits.

There are alternatives to this application, some of which are: WebEx, BudgetConferencing and Blackboard. WebEx represents a high-end solution that can exceed the limit of 15 members.

Fig. 2 – Functionalities of GoToMeeting, source: http://www.gotomeeting.com/
(Official GoToMeeting website)

Project Management

The success of every project depends in a high degree on project management. Completing processes require prior planning, programming, division and monitoring tasks and resources. For this activities, Basecamp is most used, reaching five million clients worldwide.

From [8], Basecamp divides its features into four important axes: communication, file sharing, task management and code reuse. An internal messaging system is used for communication, with the possibility to attach comments, deadlines and meta information to tasks. This is extremely useful for providing a status when dealing with customers. Custom reports can be created from presenting the current state of each task, to how many hours have been put in and by whom. A richer visual addition to the result is the Gantt chart.
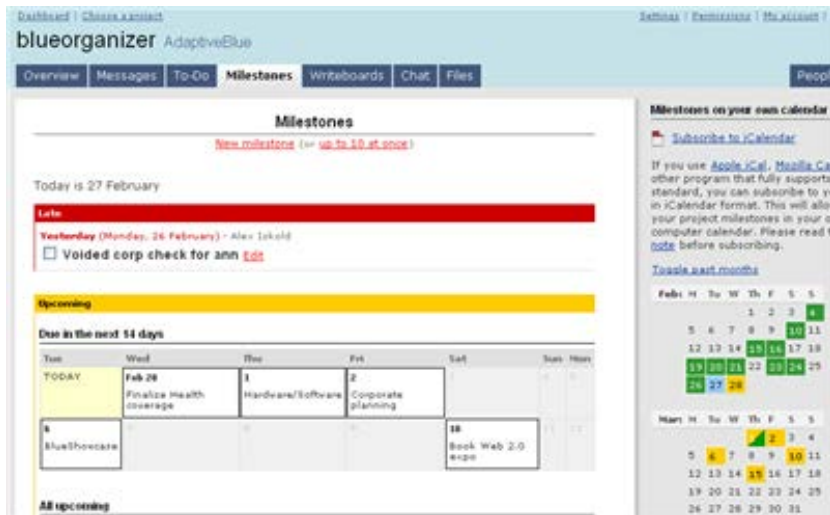

Fig. 3 – Tasks window in Basecamp

Business agenda management

A representative solution for this series is Google Calendar, an instrument from"Google Cloud", available to users in an ads-per-view system. Its user interface is simple and intuitive, based on Ajax technology. The main features are the shared calendar and the support for multiple agendas, which can later merge into one. With a native integration with Gmail and with a SMS service, Google Calendar can announce events in advance

through email or sms for all team members. Alternatives to this service are Yahoo!Calendar, 30 Boxes and Kiko. Apart from the desktop version, Google also created a simpler agenda, that receives lighter traffic. This can be used on mobile devices such as smart phones.

Synchronization process is two-way and can be used update events between the desktop version and Microsoft Outlook, Apple iCal, Mozilla Sunbird or the mobile version. Also an offline mode exists allowing the team members to access the agenda locally and creating an update when Internet is available [9].

The search is implemented Google Search engine, which offers the possibility to search not only in the events, but through cache and even on the Internet.

The events can be displayed as a daily report, weekly, monthly or display 7 custom days picked by the user.
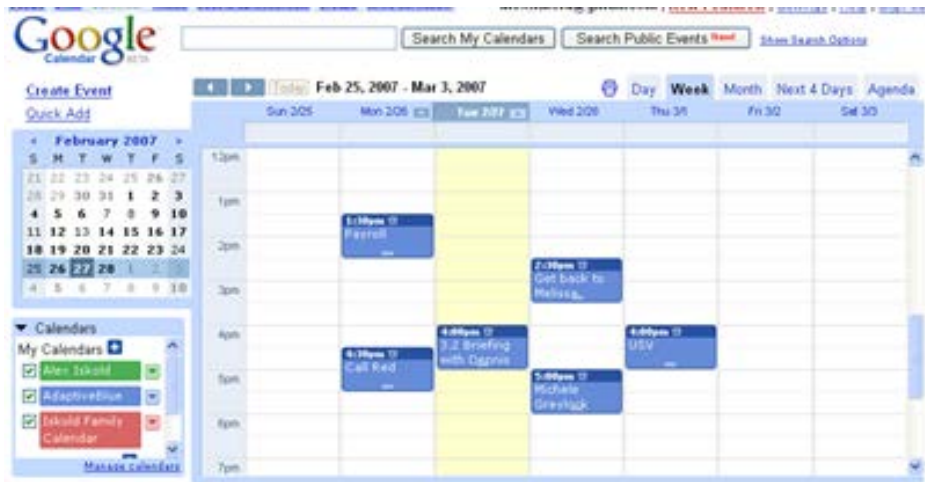

Fig. 4 – Weekly event report - Google Calendar

Code Repository

According to a survey from 2009 (fig.5) the most popular software for configuration management and implicit code repository is Subversion, founded by CollabNet, under Apache license.

This type of applications allows developers in particular to better manage changes made in code during development and maintenance phases. Subversion (abbreviated"svn") maintains old and current versions of source codes, web pages and documentation in a client-server system. It is an open-source project, and even Google Code offers svnHosting.

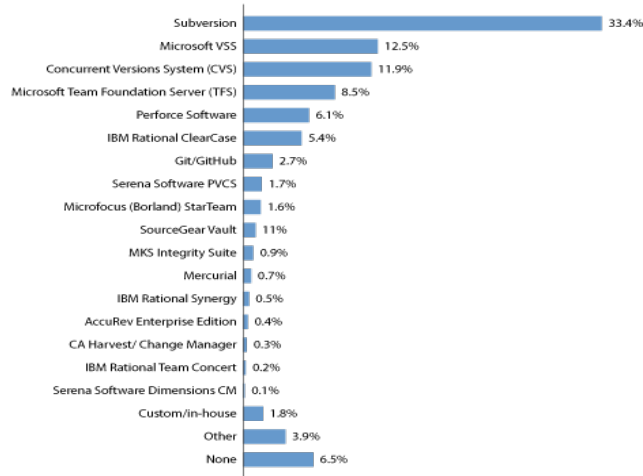**Survey: Which SCM system do you use?(Choose one)**

Fig. 5 – SCM Most Popular Survey, sursa: Forrester Research Inc., 2009

Internally, the application is setup on layers. The base layer is Fs or versioning file system, which stores user data. *Repos* adds the interface for the file system containing versioning events and functions. The next level, *mod_dav_svn* builds access through WebDav/Delta-V. WebDav contains a set of methods for file and metadata manipulation using HTTP protocol or HTTPS with SSL for a more secure connection. *Ra* layer adds methods for access local and remote. An URL is allocated to each file on the svnServer so that it can be accessed by FILE, HTTP or SVN protocol. The last layer, Client contains functions for host and client versioning, version comparison and client authentication.

Features of Subversion are presented in the next table[12]:

Function	Function
True atomic Commit Operation – Commit occurs if the process ended successfully	Format output including export to XML
Complete versioning for file rename/copy/move/delete	Support MIME
Păstrarea informațiilor de versionare pentru directoare și fișiere cu metadate, chiar și în urma mutării sau copierii.	Level and role authorization
Symbolic Link Versioning	Native support for binary files
Communicate through HTTP, SVN, WEBDAV/Delta-V	Client-server design

Table 2 – Features of Subversion

Conclusions

Establishment and operation of virtual teams is possible and the technical evolution has removed almost all impediments regarding mainly logistics.

The proposed model was setup with applications accepted on the following criteria: costs of acquisition, deployment and administration, the number of facilities offered to users in popularity among existing virtual teams and ease in installation and use.

The speed of developing new communication solutions can only lower the costs for infrastructure of virtual teams or companies, increasing their profit. Thus, they should be considered more and more an option at this time of economical crisis.

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