

# Designing a Collaboration Environment for Teleworkers

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**Abstract:** Teleworking enables a more flexible scheduling of working time and places of work on the way to the modern information society. The rapid development of cooperative application software and electronic networking systems such as Internet and the penetration of web-based applications have demonstrated the enormous potential of technical facilities for new employment models. This paper defines requirements for an effective and flexible collaborative environment supporting coupled work scenarios for teleworking. An important feature of such an environment is to support synchronous collaboration with audio/videoconferencing and data and application sharing between distributed teleworkers. New communicative and collaborative software solutions are preconditions for such scenarios. The article points out the deficits of existing applications and suggest a solution for a meeting point for teleworkers based on our experiences with teleworking in the context of the intermobil project.

## Introduction

A number of factors are driving the growth in teleworking. Teleworking is an industry trend that addresses not only business issues but also provides tangible "quality of life" gains for the workforce at large. Teleworking offers a company access to a broader base of qualified employees and reduces corporate overhead in real estate and related expenses. So a "real time" work environment with immediate access anytime, anywhere to corporate information sources can be created. Teleworking may also offer the opportunity for workers to have more choice in terms of where they work and live. As the teleworking trend emerges and evolves, it will ultimately change the current definition of "the workplace". The flexibility of teleworking can offer wide-ranging, powerful business solutions. In our project work we focus at a special kind of teleworking - Telecommuting, where the teleworker variable commute between office and home workplace. Also called alternating teleworking is surely the mostly used form of teleworking because it combines the advantages of teamwork in an office with the flexibility of homework.

## Problem Description

To tide over the local distribution teleworkers can interact with others by text based communication like instant messaging or chat and finally by an audio/video conference with application and data sharing. At the different working locations they can be connected with the internet via Ethernet, ADSL, ISDN or analog modem. If their work requires cooperation with other team members the following problems can be detected:

- it is often unknown, on which place the teleworker operates at the moment and which communication tools he could use (depending on the available equipment of the working place like video cameras etc.)
- simultaneous communication with several teleworkers requires a very high co-ordination effort using different other telecommunication channels like email or telephone before the properly collaboration can start

## Requirements to a collaboration environment for teleworkers

If all teleworkers are equipped with the necessary infrastructure (Internet binding) and required hard and software, theoretically each teleworker can initiate a video conference with each other teleworker. But the teleworker has to know:

- whether the communication partner is linked over the network at all
- which communication tools he could use (video camera, microphone, etc.)
- the IP address of the computer of the communication partner

So it is necessary to communicate over other telecommunication channels like email or telephone to get this information before the real collaboration can start. The communication partners notify their current position over this channel by transmitting their IP addresses and the tools they want to use. The main requirement for a

collaboration environment is to provide this necessary information for all teleworkers. For this purpose the following requests exist:

- the collaboration environment can be used from any workstation which is connected to the internet
- each Teleworker can detect immediately who is reachable at the moment
- he can choose a communication tool to collaborate immediately with any team member without the assistance of other communication channels

## Initial stage for solution

For managing the communication relations between the distributed partners a meeting point for working groups is needed. Such an application can use the mechanism of a directory service on a central system which is always reachable under the same network address. Such directory services already exist at the market but they provide countless functionalities which are not necessary for an effective application. For effective collaboration systems are required, which provide only the absolutely necessary functions and are fast and simply controllable by the user. For this reason an server system is needed, which takes over the functions of a communication head office. This server application has to provide the following functions:

- receive and store the communication parameters (IP addresses, status etc..) of each teleworker
- publish the current communication parameters of all Teleworker
- administration, release and blocking of the provided collaboration services like multipoint video conference system (MCU) or document sharing

The Client of the collaboration system at the teleworkers side should support the following functions:

- cyclic transfer of the communication parameters to the head office
- starting a collaboration session e.g. a video conference to one or more team members using the communication parameters provides by the meeting point

## Implementation

An solution for this problem can be a web-based client-server-system which integrates several collaboration tools. The client logs on at the server and send frequently his parameters over a special TCP-Port to the server. The server application use a central database to store and manage the communication parameters of all teleworkers. If the server won't receive any data from the client, he will send an request of acknowledgement and then mark the teleworker as logged out from the system. This type of session management facilities might be enough to control the participated teleworkers. Using a html-form the teleworker can request the communication parameters and status of any other team member logged on at the system. For easier handling the solution should integrate several collaboration tools e.g. as COM+-applications like NetMeeting. At the client-side ActiveX controls can be used for starting the communication applications directly from an WWW browser site. At the moment we are developing and testing several implementations based on the explained concept.

## Conclusion and future work

Related work shows that the new dimension of coupled work in teleworking scenarios becomes more and more important and that tools already exist to support synchronous communication. But the requirement of a general-purpose environment supporting effective and flexible collaboration between mobile and location independent teleworkers is not fulfilled by these systems. Therefor we defined the requirements to an collaborative environment for teleworkers and developed an universal solution for a meeting point. Implementation and testing of the applications under practical conditions are now in progress. We are planning to improve the interface between these services and others and to integrate more various collaboration applications.

## References

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