

Community Aspects of a Virtual Enterprise

Helge Kahler & Markus Rittenbruch

Institute for Computer Science III, University of Bonn

Roemerstrasse 164, D-53117 Bonn, Germany

Tel: (+49)0228/73-4299, e-mail: {mr, kahler}@cs.uni-bonn.de

Awareness and Privacy

One important aspect of a VE is the mutual trust among its members. Klein ([Klei94]) suggests that information and communication systems allowing to monitor and understand the activities of a partner in the VE may replace and at the same time support trust building measures. The discussion about this topic is lead in the CSCW community under the label awareness.

Awareness can be defined to be the "understanding of the activities of others, which provides a context for you own activity" ([DoBe92]). Several studies have shown that it is crucial for cooperation to be aware of what others do ([Bowe94], [HeLu91]). Awareness mechanisms can be considered to be one way to compensate for the spatial separation of team members in a VE since they provide means to get to know what other team members are working on currently. This can include a sign on the screen that another team member is currently using his/her computer and may be available in the office or the ability to see a history of what documents another team member has worked on in the last week.

The counter part of awareness in the discussion of computer supported cooperative work is privacy. Similar to the ways people protect their privacy in paper based work settings there need to be ways for computer supported team members to protect their privacy. But since for a good cooperation access to others and information are crucial on first sight it remains open what the computer supported equivalent for closing the door in order not to be disturbed or putting objects from the publicly accessible desk into a drawer should be. In order to not only draw experience from working practice but to put these experiences back into practice Bellotti and Sellen ([BeSe93]) have come up with design principles for privacy issues for computer supported cooperative work. They identify a set of criteria serving as a checklist for system evaluation including trustworthiness, appropriate timing, minimal intrusiveness, flexibility, and others.

The balance between awareness and privacy may be very delicate: While a team member might want to see what someone else has done the other person might not want to give this information away. Here, the groupware system must be able to handle different adjustments of awareness and privacy to allow for the support of an adequate level of trust between different teams and team members in a VE. Ideally, the groupware system helps to move up the "spiral of trust" (cf. [Sydo96]).

Access Policy

Generally a VE has no central control authority and teams are built and disestablished with the projects that a VE is involved in. Each of the teams constituting a VE is contributing knowledge and data to the common project. This requires a flexible policy for data access in the VE that takes into account the relation of the teams and the roles of the team members in the VE. At the beginning of a cooperation in a VE where teams from two companies cooperate they will usually not be willing to give the other team broad access to their data. During the cooperation mutual trust and the need to access each others data will grow.

Researching access mechanisms in database management systems and operating systems Greif and Sarin ([GrSa86]) conclude that these might suffice for data modeling and administration of business processes but that they are not suitable for cooperative work processes. While traditional approaches rely on hierarchic access rights that usually can only be changed by a system administrator groupware systems particularly for a flexible organization like a VE need to provide means for teams and even individuals to grant access rights for data they "own" and change them themselves according to the changing needs of cooperation.

Tailorability

Groupware that is meant to be used in a VE needs to be very flexible. Not only must it meet the needs of all the teams from different organizations that build a VE at one time but also be adequate for different VEs that an organization might contribute to at the same time or consecutively. Moreover, the requirements even within one VE can change over time and different subunits within one organization will also have different requirements. Thus, the groupware should be tailorable to the needs of a VE including the (possibly conflicting) needs of the different participating organizations, teams, and individuals.

Tailoring groupware is not just an individual but also a team-related action. Some good experiences have been made with "translators" who support users and groups in tailoring and sharing individual customization and at the same time "translating" between end users and system support or developers about how both groups can work together to reach a well-tailored system (cf. [Kahl95]).

Particularly for a flexible and fast-changing organization like a VE with possibly enormously different requirements from the participating teams tailorability is not only demanded from the groupware system but needs to be supported by the VE's organizational culture e.g. by providing tailoring staff or rewarding reasonable tailoring activities by teams or team members.

Conclusion

The VE Sigma, which is our field of investigation, can be understood as a special form of network community. As a structure that depends vitally on the use of communication and cooperation technology Sigma has the need for carefully designed systems that consider the specific needs of such an organization form. The geographical distribution, lack of central control, and difference of organizational cultures of the participating teams are the challenges that Sigma poses to communication and cooperation technology. They result in the problems of many different and changing requirements for the cooperation software and the difficulty to build up a trust relationship between the team members due to the lack of casual meetings and informal communication.

The design requirements we pointed out, awareness and privacy, access control and tailorability can be first steps towards the development of specific requirements for VE like Sigma. They give hints on where to focus the endeavor and provide (partial) solution. While this paper sheds a light on only some selected CSCW topics we believe that the general CSCW approach of exploring concrete organizations and work settings and then design or improve and configure groupware applying end user participation and stepwise evolution of the groupware in use are adequate for VEs since they allow to deal with a VEs complexity and dynamics. This complexity and dynamics lets inevitably fail any attempt to put technology into an organization if it is based on the belief that the requirements and future needs can be anticipated.

Much of the intra- and inter-team dynamics are beyond the scope of technical support but cooperative technology is strongly affected by them and makes them visible. Therefore, the design, development and tailoring of groupware for a VE must be accompanied by organizational measures to overcome the difficulties inherent to a VE.

References

- [ArHä95] Arnold, Oksana; Härtling, Martina: Virtuelle Unternehmen: Begriffsbildung und Definition. Arbeitspapier 3/1995 der Reihe "Informations- und Kommunikationssysteme als Gestaltungselement Virtueller Unternehmen". URL: <http://www.uni-leipzig.de/wifa/oki/VU-Abs.html>
- [BeSe93] Bellotti, Victoria; Sellen, Abigail: Design for Privacy in Ubiquitous Computing Environments. In: Proceedings of the ECSCW '93, Kluwer, pp. 77-92
- [Bowe94] Bowers, John: The Work to Make a Network Work: Studying CSCW in Action. In: Proceedings of the CSCW '94, ACM Press, pp. 287-298.
- [DoBe92] Dourish, Paul; Bellotti, Victoria: Awareness and Coordination in Shared Workspaces. In: Proceedings of the CSCW '92, ACM Press, pp. 107-114
- [Fais95] Faisst, Wolfgang: Welche IV-Systeme sollte ein Virtuelles Unternehmen haben? Arbeitspapier 1/1995 der Reihe "Informations- und Kommunikationssysteme als Gestaltungselement Virtueller Unternehmen". URL: <http://www.wi1.wiso.uni-erlangen.de/projects/vu/publ.html>
- [GrSa86] Greif, Irene; Sarin, Sunil: Data Sharing in Group Work. In: Proceedings of the CSCW '86, ACM Press, pp. 175-183
- [HeLu91] Heath, Christian; Luff, Paul: Collaborative Activity and Technological Design: Task Coordination in London Underground Control Room. In: Proceedings of the ECSCW '91, Kluwer, pp. 65-80
- [Kah95] Kahler, Helge: From Taylorism to Tailorability. In: Proceedings of the HCI '95, Vol. 20B, Elsevier, pp. 995-1000
- [Kah96] Kahler, Helge: Developing Groupware with Evolution and Participation - A Case Study. In Proceedings of the Participatory Design Conference 1996, CPSR, pp. 173-182
- [KaRo96] Kahler, Helge; Rohde, Markus: Changing to stay itself. In: SIGOIS Bulletin, Vol. 17, No. 3 (December 1996), pp. 62-64
- [Klei94] Klein, Stefan: Virtuelle Organisation - Informations- und kommunikationstechnische Infrastrukturen ermöglichen neue Formen der Zusammenarbeit. URL: <http://bandon.unisg.ch/iwi4/cc/genpubs/virtorg.html>
- [MMPB96] Mambrey, Peter, Mark, Gloria, Pankoke-Babatz, Uta: Integrating user advocacy into participatory design: The designer's perspective. In: Proceedings of the Participatory Design Conference 1996, CPSR, pp. 251-260
- [Merk96] Merkle, Martina: Virtuelle Organisationen - ihr Erfolgspotential: eine integrative Informationsinfrastruktur. In: Institutsbericht des IFI (Universität Zürich), Juni 1996. URL: <http://www-iwi.unisg.ch/iwipub/dr-semi/ss96-zh/mme/iwi.htm>

- [MeFa95] Mertens, Peter; Faisst, Wolfgang: Virtuelle Unternehmen, eine Organisationsstruktur für die Zukunft? In: technologie & management 44 (1995) 2, pp. 61-68
- [Ott96] Ott, Marc C.: Virtuelle Unternehmensführung - Zukunftsweisender Ansatz im Wettlauf um künftige Markterfolge. In: Office Management 7-8/1996, pp. 14-17
- [Scho94] Scholz, Christian: Die virtuelle Organisation als Strukturkonzept der Zukunft? Arbeitspapier Nr. 30 des Lehrstuhls für Betriebswirtschaftslehre, insbesondere Organisation, Personal- und Informationsmanagement der Universität des Saarlandes, 1994
- [Such 87] Suchman, Lucy: Plans and Situated Actions. The Problem of Human-Machine Communication. Cambridge University Press, 1987
- [Sydo96] Sydow, Jörg: Virtuelle Unternehmung - Erfolg als Vertrauensorganisation? In: Office Management 7-8/1996, pp. 10-13