

# Virtual Office for Nomadic Collaboration

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## Abstract

In this paper we highlight the research area in the context of our Virtual Office Program in Nokia Research Center. The program is to explore the new mobile technologies and architectures for nomadic users. This paper presents a special research subject about the human roles in nomadic working environments and provides initial design on a conceptual reference framework to address the flexibility of role switching.

## Introduction

Current way of supporting mobility in working environments is to connect people back to typically fixed office services, through applications like mobile e-mail, mobile CRM applications or mobile Web browsers. How to enable smooth and flexible communication between people wherever they are, is a critical factor of success in this type of design. For this workshop, we look at a special aspect of communication for nomadic users: multiple roles (or role switching). One of the characters of the nomadic users is the position of a fixed (virtual) working place becomes less appealing. The dynamic formation of real workplaces and group-based communication is more identified or recognized in mobile workers. This paper provides a technological reference framework for virtual office to address

core requirements such as handling multiple roles and profiles in communication; and connecting to communities in large.

## Multiple roles in communication

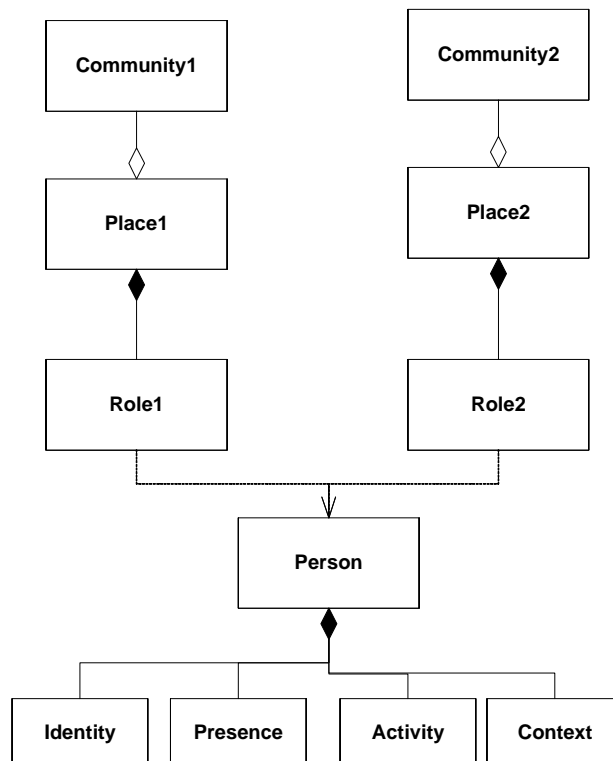
We believe it is just matter of time that everyone will be eventually connected with each other through their mobile devices ubiquitously and transparently. This implies that we will be continually participating in both our personal social groups and organization's business processes ubiquitously (Marshak 1994). This will become obvious especially when people are doing their jobs more off-site. As mobile phone is originally designed to support personal communication, the usage of mobile phone, however, is not limited for personal-to-personal communication only, especially in many different contexts for personal and business activities. Unlike the desktop world, where the need for managing work and personal life is not so critical, the need in mobile domain is more important because people are living their personal and business life side by side with their mobile phones wherever they go (we can assume people have their phones always). While people are using their devices for communication and collaboration, in most simplified cases their activities can be recognized as being engaged into either their personal or work-related activities. In reality people play different roles over time, even in short period of time. The roles can be well-defined (clear) or undefined (unclear); long-term or short-term, and so on. The point here is not to identify a whole classification of activities though it would be useful, but considers the design of a new system which supports multiple roles in different communication contexts and maintains the contexts while the role switching is needed during the communication. Moreover, we want to carry out trial studies to explore new ways of working for nomadic users. Based on the observation in our user research study, a typical nomadic user has to keep their social roles and explicitly and manually maintain the contexts respectively while communicating with different people, such as colleagues, family members, and friends.

One of the most important design questions we identify is how to bring the concept of roles into the centre of the current design of mobile collaborative systems, enable members of the community seamlessly sense the past and current roles and activities of others and enable the users to have smooth switch between their different social roles in different contexts. Here the context implies the virtual or real "place" where the communication within the specific community takes place. In our understanding, the major difference between nomadic and mobile users is the space they keep dynamically changed in terms of their roles; and the lifespan or lifecycle of the space. Mobile users usually have more or less fixed roles and (virtual) working places, whereas nomadic users are more likely to be engaged into multiple roles and communities more frequently.

In our research-on-going program, we try to define a reference model and build the system to study the user behaviors and improve our model in the sub-areas such as role and profile management including customization and personalization, and role-based activity awareness model. In the following parts we will describe our initial reference model. Note that one of the added-value of such design is to enable the user acting or to be recognized more easily by the others in the shared collaborative virtual space; and at the same time the user can react appropriately in a more predictive manner by the others because of the recognized roles. When working physically in the shared physical space, like in the office or the room, roles are sensed automatically and switching is implicit. Certainly, we know that the practical need for having multiple active roles within virtual space for nomadic users is subject to be studied and evaluated in real trial.

## Reference model

The image below presents the initial reference model of virtual office system (the system) for nomadic users.



**Figure 1 Reference model**

The center part of the model is the Role. The Role is a person's live "image" recognized by the others in a Place. A Role from same person is unique to one

place/community at a given time, but one person is allowed to have multiple roles in one or many places/communities in different time.

Role mainly consists of person's current state including Identity, Presence, Activity and Context information, but presented in a way meaningful in the particular Place and Community. The contextual and historical information of the Place and other Roles in space can affect the Role. The Role can be used to obtain past data about Identity, Presence, Activity, and Context information. Thus data structure of Role is more like a collection of information over time with some contexts in work places, which can serve the purpose of playing back the past activities for other members, even when the person is not available right now.

The Context box in Figure 1 is another key element to connect almost every piece together in the environment. It provides context model such as context facts and even rules to classify role-independent information. The use of rules can provide more advanced or intelligent context detection and evolution mechanism.

The Place is a persistent space for specific Community, i.e. set of members sharing an interest or other kind of topic. All communication and collaboration within a Community takes place in this Place. Activities, Presence and Identities define the absolute state of the person. For example the person is doing something specific at one moment, but the system processes that information as parts of different Roles in different communities, depending what is a meaningful way to represent that activity.

## Main research areas and future directions

So far we have identified our initial understanding of this course and proposed a reference model. This model will be part of the Virtual Program<sup>1</sup>, a new research project started in 2007 in Nokia Research Center, Finland. There are other technological aspects this program plans to study, for example, unified communication, activity awareness and context model and management. In the case of this position paper, we have identified our research area and highlighted our main research subject, that is, the nature of roles in nomadic collaboration environment.

## References

1. Marchak, S. David (1994): 'The Disappearance of Groupware', in P. Lloyd, (ed.): Groupware in the 21st Century: Computer supported cooperative working toward the millennium. Adamantine Press Limited. 1994, pp. 26

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<sup>1</sup> Available in August 2007 under <http://research.nokia.com>