

Beyond the small social group: scalability issues in mobile communications

Giuseppe Lugano
University of Jyväskylä (Finland)
giuseppe.lugano@jyu.fi

Scalability is an important property of complex technical systems. Although there exist many definitions of the concept, scalability is typically related to measures of system performance (Hill, 1990; Hwang, 1992). A system scales well if its performance does not decrease when additional resources are added to a single node (vertical scalability) or when more nodes join the system (horizontal scalability).

As computer networks are inherently social networks (Wellman, 2001), scalability can be analyzed not only from the technical viewpoint of computer architectures, but also from the perspective of social interaction. In this context, horizontal scalability refers to the number of users, or size their social networks, while vertical scalability is about the properties of social ties and the flow of informational resources. With the convergence of computer networks and mobile networks into a global digital network, scalability issues in mobile applications can be investigated to identify current trends and challenges. One of main questions concerns the implications of mobile communication when its scale goes beyond interpersonal and small social group interactions and includes also many-to-many communication with the personal community.

From the perspective of social interaction, scalability issues in mobile communications have not been discussed much. Most scholars have highlighted the large-scale social, economic and political implications of small-scale interactions, taking for granted the interpersonal nature of mobile communication. Mentioning the role that the chains of text messages exchanged by Filipipos played in the resign of president Estrada in 2001, Katz and Aakhus (2002) observed that *„the mobile phone, a quintessential instrument for two-way interpersonal communication, can also work as a tool to spur and coordinate the action of masses for political change”* (p.3). Rheingold (2002) coined the term smartmob to refer to the mobile-mediated large-scale mobilizations of people with a common goal, such as political protest. According to Ling (2004), smartmobs have not extended the traditional scope of mobile communications their nature is neither interactive nor allow modifying the original plans. The author goes further, considering one aspect of scalability, the number of people that can be coordinated, as one of the current limitations of the mobile device. Indeed, beyond the threshold of 8-10 persons, it is much easier to use time to coordnate a group rather than an interactive process mediated by mobile communications. When beyond that threshold, the scale of mobile communication enters in the domain of mobile virtual communities, the natural extension of virtual communities that exist online and present the following characteristics (Rheingold, 2003).:

- *many-to-many, desktop and mobile, always on*: instant access to people and informational resources;
- *interactive coordination of small or large groups*: even if the group is typically limited to 4-8 persons, mobile virtual communities can scale beyond that limit;
- *shared purpose*: gaming, social interaction, artistic media, business, politics.

However, Rheingold’s mobile virtual community is only one of the two main facets of mobile community. More specifically, what keeps mobile virtual communities connected is a shared interest rather than a person. On the contrary, it takes the name of mobile social network if the mobile community is centred on a single individual. Both egocentric mobile social networks and communitarian mobile virtual communities can benefit from the technical advances that took place with

the process of digital convergence. Three are major novelties: the availability of sensors to establish social connectivity on the basis of physical proximity; the capability of broadband mobile connections to support rich-media interactive communication; and the transformation of mobile phones into portable multimedia computers, or smartphones, which open up an almost unlimited number of interaction with people and objects.

Mobile social software (MoSoSo) is the class of mobile applications that enables mobile communities, widening the original scope of mobile communications beyond the small social group. From this perspective, MoSoSo is a natural complement to phone calls and text messages, applications designed for interpersonal communication. Being a product of the third generation of mobile technologies (3G), it provides a real meaning to a mature technological infrastructure whose potential has not been yet exploited. Even if commercial MoSoSo applications are not widespread yet, a number of academic prototypes investigated mobile group support from different viewpoints, such as context awareness and proximity interaction (Holmquist et al., 1999; Espinoza et al., 2001; Rantanen et al., 2004; Eagle and Pentland, 2005). As this category of applications is expected to gain importance in the coming years, the research community should address the social implications of this structural change in the scale of mobile communications. For instance, what kind of support is needed to let users cope with non-stop flows of informational resources? Which are the new challenges for personal privacy management? Would self-organizing ad-hoc mobile communities represent a resource for grass-roots solution of the challenges of globalization or a threat to political stability? Gaining knowledge on such issues is essential to avoid turning MoSoSo applications and ubiquitous interaction from useful support to human action into gadgets increasing the complexity of people's lives.

REFERENCES

- Eagle, N., Pentland, A. (2005) Social serendipity: mobilizing social software, *IEEE Pervasive Computing*, Vol.4, n.2, pp.28-34.
- Espinoza, F., Persson, P., Sandin, A., Nyström, H., Cacciatore, E., Bylund, M. (2001) *Geonotes: social and navigational aspects of location-based information systems*. In: Proceedings of the UbiComp '01, pp.2-17.
- Hill, M.D. (1990) What is scalability?, *ACM SIGARCH Computer Architecture News*, Vol.18, n.4, pp.18-21.
- Holmquist, L.E., Falk, J., Wigström, J. (1999) Supporting group collaboration with inter-personal awareness devices. *Personal technologies*, Vol.3, n.1&2, pp.13-21.
- Hwang, K. (1992) *Advanced computer architecture: parallelism, scalability, programmability*, Mc Graw-Hill.
- Katz, J.E., Aakhus, M. (2002) *Perpetual contact. Mobile communication, private talk, public performance*. Cambridge University Press.
- Ling, R. (2004) *The mobile connection: the cell's phone impact on society*. Morgan Kaufmann.
- Rantanen, M., Oulasvirta, A., Blom, J., Tiitta, S., Mantylä, M. (2004) *InfoRadar: group and public messaging in the mobile context*. In: Proceedings of the 3rd Nordic conference on Human-Computer Interaction (NordCHI), pp.131-140.
- Rheingold, H. (2002) *Smarmobs. The next social revolution*. Basic books.
- Rheingold, H. (2003) *Mobile virtual communities*. The feature.
- Wellman, B. (2001) Computer networks as social networks, *Science*, Vol.293, n. 5537, pp.2031-2034.