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Chapter XV

An Enterprise Viewpoint of Wireless Virtual Communities and the Associated Uses of Software Agents

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We envision the integration of the concepts of virtual communities, electronic markets, and ubiquitous wireless services into agent-enhanced mobile virtual communities which we call AMV-communities, a set of which form the AMV-community-space. We present concepts for an AMV-community modelled with RM-ODP Enterprise Viewpoint concepts, and outline an architecture of AMV-communities using software agents attached to roles. We also illustrate how we cope with disconnected computing by using agents and meta-policy rules.

INTRODUCTION

This is the age of virtual communities, electronic markets, and mobile computing. A virtual community (Rheingold, 1993) is a conceptual space enabling sustained interactions among people across geographical boundaries. A member of a virtual community cannot only utilize services provided by that community but also contribute content and services to that community. While many virtual communities are global, transcending geographical boundaries, geographically based virtual communities have also emerged, often called wired neighborhoods (Doheny-Farina, 1998), which focus on the interests of a physical community.

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Emerging are also the concepts of electronic marketplaces such as enablers of customer-to-business and business-to-business electronic commerce (e.g., NetAcademy Team, 2000; Rachlevsky-Reich, 1999; Sandholm, 1999). Electronic auction houses (e.g., Amazon, 2000; eBay, 2000; Sandholm, 1999) are extremely popular, and there are numerous Web-based shopping malls. In Hagel and Armstrong (1997), the concepts of virtual community and electronic marketplace are married. Virtual communities form a space not only for discussions and information sharing but also functions as a place for commerce. Virtual communities become a means of maintaining relationships among buyers and sellers. One usually participates in several of such global virtual communities, wired neighborhoods, and electronic markets which then become sources of services. Indeed, some business Web sites are moving from simply selling items to building communities. For example, www.amazon.com lets surfers input their reviews on books.

Such virtual communities and electronic marketplaces are growing and new ones emerging, but mainly over wired networks. Wireless computing is the emerging technology wave enabling mobility, and connectivity where laying cables is difficult or impossible. There has been a frenzy of research from both academia and industry towards anytime and anywhere mobile access to information and computational support (for example, see http://www.acm.org/sigmobile). We are seeing rapid developments in the variety and functionality of mobile computers, including smartphones, communicators, palm-sized PCs, handheld PCs, mini-notebooks, notebooks, and laptops, in wide-area wireless networks such as GSM, GPRS, PHS, and UMTS, and in wireless (and some ad-hoc) LANs (e.g., WaveLAN, MobileNet, Bluetooth: http://www.bluetooth.com). Commercial wireless portals are being created to provide information services to networked mobile computers (e.g., MSN Mobile: http://www.mobile.msn.com/), Palm's Web clips: http://www.palm.net/, and Lucent's Zingo: http://www.zingo.com/). Such portals (wired and wireless) provide a mixture of information (e.g., stock prices, weather reports, music, discussion lists) and can be viewed as congregation points for virtual communities.

With ubiquitous computing and networking, we could see wireless LANs and WANs of varying granularities connecting not only computers but computer-controlled networked appliances and embedded systems such as toasters, refrigerators, dog collars, and wearable computers (http://www.wearablecomputing.com/). We will see the car's wireless LAN, the home's wireless LAN, the office's wireless LAN, and beyond Internet cafes, restaurants could be offering network services via their wireless LANs. The shopping center in which the restaurant resides could offer their wireless information services. In addition, Bluetooth networking enables ad hoc wireless networks to be formed just when several mobile devices are close enough to each other. Such LANs become a means to connect to wired neighborhoods, global virtual communities, and electronic marketplaces.

What we envision is the integration of the concepts of virtual communities, electronic marketplaces, and ubiquitous wireless services into mobile virtual communities which goes beyond the current ideas of wireless portals providing information. Such mobile virtual communities will also permit interaction with other community members and member-generated content as in virtual communities, and the creation of subcommunities representing electronic marketplaces. These mobile virtual communities can be of varying granularities reflecting the geographical granularities of the wireless networks, but could also be global (as much as the Internet is global) and could be linked or interrelated. For example, subcommunities of short lifetimes could exist (e.g., electronic auctions) involving mobile device users.