GROUPWARE CALENDAR SYSTEMS (GCS) MODELLING IN A VIRTUAL ENVIRONMENT: USING ROLE ACTIVITY DIAGRAM (RAD)

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ABSTRACT

As technology moves away from the desktop to a world of loosely coupled devices, groupware applications are transforming communications by enabling new ways of processing and delivering work across time and space. This virtual environment becomes all pervasive, temporal coupling takes place over the web via communication technologies such as e-mail, videoconference and groupware calendar systems.

Groupware Calendar Systems (GCS) allow personal calendars to be shared among users on-line in order to facilitate the co-ordination of meetings. This paper highlights the need for an improved understanding of not just how to coordinate and synchronise work from a technical perspective but also how to include a greater understanding of the human side while considering some aspects of the technical interactions.

This paper uses an example to demonstrate the extension of the modelling tool, Role Activity Diagram (RAD) into a virtual environment to capture the synchronization and coordination of GCS workflow.

KEYWORDS

Groupware Calendar Systems (GCS), Role Activity Diagram (RAD), Virtual Environment, Synchronization

1. INTRODUCTION

Place, space and time are the essential predicates to calendars systems that have an under-realised potential to assist in the co-ordination activities of Web technologies and groupware applications. With the growing use of web-based technology, integrated web programs, and the emergence of the paradigm of interconnected web weaving (Berners-Lee and Fischetti 1999), an alternative approach is needed to groupware modelling; that is, one that is defined by hypertextual characteristics (Scharl 2000), together with the convergence of technology and contextuality (Jones and Spiro 1995).

In organisations people fundamentally work in groups while having loose coupling relationships with other group members and partial inclusion into other organisational groups in a 'temporal context' (McGrath 1990). Technologies not only affect the formation of the group itself but also the relationships between its members in what we describe as a '*technological temporal context*'.

As the virtual environment becomes more pervasive (Hansman et al. 2001), supplementary temporal coupling is increasingly taking place over the web through communication technologies such as e-mail, videoconference and groupware calendar systems. This makes it essential that we have an improved

understanding of not just how to coordinate and synchronize work from a technical perspective but also of how to include and integrate a greater understanding of the human aspects of interactions.

McGrath identified three temporal 'infrastructure properties' for group work that are enabled and constrained by technology: 1. Scheduling. 2. Synchronization, and 3. Allocation (McGrath 1990). The objective of groupware is to facilitate groups to communicate, collaborate and coordinate their activities in a shared environment (McGrath 1990).

Our aim is to examine the role of sharing calendaring systems in synchronization and coordination of work, and to extend it to a Web-based virtual environment that does not ignore the human contribution of tacit knowledge. It follows that the design should reflect accurately the tasks that people perform and the interactions among them (Turner 1987), rather than merely reflect an analysis of the actions they perform.

2. GROUPWARE CALENDAR SYSTEMS (GCS)

Groupware Calendar System (GCS) defined, as "on-line networked software" is one of the earliest applications in computer supported cooperative work (CSCW). Proprietary programs of Groupware Calendar Systems allow personal calendars to be shared among users over a network in order to facilitate the co-ordination of scheduling meetings. It supports personal work and simultaneously supports social collaboration (Palen 1998). GCS is used as a communication mechanism in organizations (Ehrlich 1987a; Palen 1998).

Since the late 1970s, calendars have changed and developed both in terms of their physical appearance and in terms of their usage, for instance, paper calendar filofax to wireless and the web-based calendar (yahoo, msn). This shift has started to generate a different perspective on our understanding of calendar use and human interaction. This new medium for human interaction brings with it new issues, such as a 'web-calendar' is private property with a public interface.

Attempts have been made to improve its synchronization and coordination functionalities, and various designs have been worked on, such as 'Priority indicator' (Beard and Palaniappan 1990). 'Calculating probability attendance' (Mynatt and Tullio 2001) and expressionistic 'latitude model' (Pino and Mora 1998). These have been accompanied by the effort to address some of the privacy and security issues which are generated by having a shared calendar, in that users are allowed to give an access authorization and can specify the level of calendar viewing, for instance by supplying full or restricted access.

Despite its potential role within a temporally and spatially dispersed work, the benefits are not been fully appreciated. Additionally, interoperability, open standards and contextualisation of GCS are important areas that need to be addressed in order for GCS to be in a virtual environment.

3. ROLE ACTIVITY DIAGRAMS (RAD)

We propose and extend the Role Activity Diagrams (RAD) tool (Holt et al. 1983) to depict temporal and spatial interaction of GCS. Although RAD is nearly 20 years old, the initial aim sought to design an IS environment for the integration of tools with tools, tasks with tasks, and people with people. RADs use a: "number of notational primitives to express very complex process behaviour" (Kawalek 1994). The complexity level is dependent upon the modellers' requirements to make information explicit. The designers' selection of detail marks a departure from the traditional decomposition perspective of data structured approaches towards a rule-based paradigm (Warboys et al. 1999). The process paradigm school adopted and successfully incorporated RAD to assisting in the design and realisation of organisational goals (Ould 1995). In doing so the process approach recognises that there exists aspects of tactic human work activity that cannot be routinized to the same degree as in simple workflow systems design. This is achieved by codifying human activity simply as a 'black box' where 'an activity' takes place. Kawalek suggests RADs' "seem to be best suited to expressing the modularity of work; the actions that staff undertake, and the synchronisation between roles" (Kawalek 1995). Contemporarily, we have to embrace the asynchronous and disjointed aspects of work, the temporal and spatial aspects of coordination.

A RAD is a conceptual ‘net or web’ model representation of the structuring interactions and coordination in ‘collaborative’ (between people) work and integrative (between people and machines) interactions (Warboys et al. 1999).

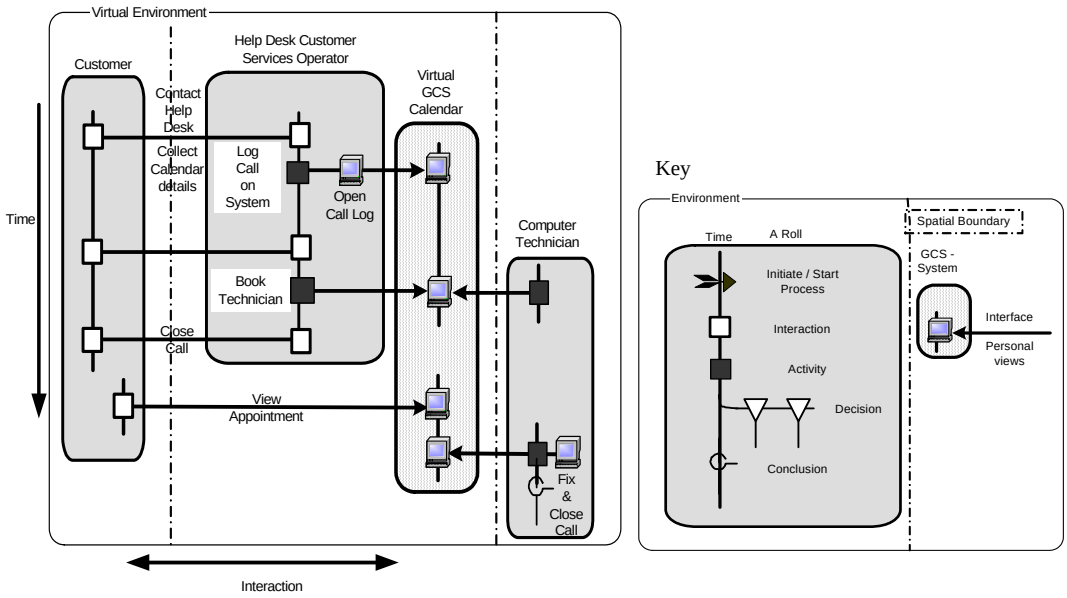
In summary, the key features of RAD are:

- clarifies business process context / easily understood notation
- provides model granularity of detail
- delineates roles undertaken in the process
- displays all types of interactions in a timed sequence
- RAD does not address the organisational strategy issues.

4. GCS AND RAD

Fig. 1 demonstrates the key features of temporal interaction and the role GCS plays in the process of coordination in a virtual environment. The scenario depicts a customer’s interaction during the pursuit of calling out a computer technician to fix their machine. An IT help desk environment was chosen, as it typifies a temporal coordinated environment. The temporal interactions are shown by the addition of a ‘role calendar’ operating in the virtual environment. Unlike the conventional application of GCS, as an adjunct function, our proposed model shows that GCS coordinates and couples with the rest of organizational functions as well as with the external calendar applications or systems.

Figure 1: RAD Model of a Help Desk process –



Working through the key features, when a call is taken, through either with virtual automation or human interaction, the process / customer services operator collects and logs into the customers virtual calendars interface simultaneously with logging the call. The customer’s calendar has predefined access rules and in this case permits access to free timeslots. Finding the time and date that is suitable for both the customer and technician, the interaction is confirmed and the technician booked. The ‘Virtual GCS calendar’ in Fig. 1 shows where the interaction and interoperability take place. The customer can view, change or revise the appointment and the technician has a view of all the pending jobs.

Extending the scenario further, we can consider a calendar that automatically fills in all the relevant dates for a conference submission. It could also supply all the travel and hotel arrangements as well as earmark duration of time to write the paper!

GCS could play a central role in synchronizing and coordinating work, which is temporally and spatially dispersed. This diagram demonstrates the role of GCS in synchronizing and coordinating work across the

temporal and spatial boundaries by depicting and capturing interactions. It also demonstrates the need for interoperability and open standards so that even where there are different systems in use the customer/supplier is able to exchange information.

5. CONCLUSION

Calendaring and group scheduling products are well established for organizational use, but they are usually limited to exchange of information among users of the same system, and are usually within the boundaries of a single organisation.

Hurdles to creating a semantic web remain, including the creation of a shared set of meanings, which are capable of being woven into Web sites, and that can be instantly recognized by a wide range of programs. Web based GCS contextualises personal information in public space in response to increasingly dispersed and disconnected organization. The central point that this paper makes is that in a virtual environment, context, time and space are redefined and reshaped and linked by web technologies. RAD modelling notation and syntax would, we suggest, fit in well as the tool that would model those organisations that have the emergent integrating framework of distributed systems that utilise the Internet.

We revisited the Holts et al. concept within a current concept of a virtual environment of web based groupware calendar systems. The model showed the role of GCS in synchronization and coordination of work across time and space. It also recognises that having Internet standards are the essential core to GCS interoperability.

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