

CoAKTinG: Meeting Record and Replay

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ABSTRACT

Meetings provide a rich source of knowledge, that can be captured with appropriate tools and technologies. By integrating this information, post-meeting tools can be developed to replay meetings.

1. INTRODUCTION

The CoAKTinG project [1] aims to advance the state of the art in collaborative mediated spaces for distributed e-Science. In doing so, the project is integrating several knowledge based and hypertext tools into existing collaborative environments (such as the Access Grid [2]), and through use of a shared ontology to exchange structure, promotes enhanced process tracking and navigation of resources before, after, and while a meeting occurs.

In this paper, we look at how the CoAKTinG tools are used to record a meeting and the production of a replay to aid reviewing the meeting.

2. TOOLS

2.1 Compendium

Compendium, first developed in 1993 as an approach to aid cross-functional business process redesign (BPR) teams, has been applied in several dozen projects in both industry and academic settings [5]. Its origins lie in the problem of creating shared understanding between the team members, typical of those attending teams working over weeks or months to design business processes: keeping track of the plethora of ideas, issues, and conceptual interrelationships without needing to sift through piles of easel sheets, surfacing and tracking design rationale, and staying on track and “bought-in” to the project’s overall structure and goals [8].

The key feature of the early approach was the combination of an Issue-Based Information System (IBIS) concept-mapping tool [6], which supported informal and exploratory conversation and facilitation, with a structured modelling approach [7]. This allowed teams to move along the spectra of *formal to informal representation*, and *prescribed to spontaneous approaches*, as their needs dictated. It also let them incrementally formalise data [10] over the life of the project. As the approach was tested and refined over the course of several years, additional modelling methods were added, plus tools to transform Compendium’s hypertext models into established organisational document forms, and vice-versa [9].

In our experience, Compendium introduces a distinctive element to the design space of knowledge technologies, namely,

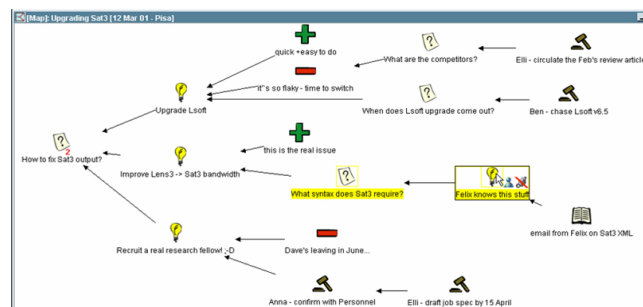


Figure 1: A Compendium map showing various node types and links

making meetings into true events for group knowledge creation which leave a *trace* - a structured, collectively owned, searchable group memory that is generated in real time as a product of a meeting. Effective, on-the-fly construction of knowledge resources does not come “for free” - the lower the effort invested at the capture stage (e.g. simply video recording all meetings, or taking conventional minutes), the more work is required for collective reuse and computational support. Naturally, we want quality knowledge resources for minimal effort, and while smart analysis technologies will continue to push the boundaries, there are pragmatic factors to consider: what is possible *now*? Compendium tackles the capture bottleneck that any knowledge construction effort must confront, by investing effort in real time quality capture by a facilitator, mediated and validated by those at the meeting.

2.2 I-X

I-X is a suite of tools[12] whose function is to aid in creation or modification of a product (such as a document or a physical entity). The main interface is the I-X Process Panel which, in its simplest form, acts like an intelligent ‘todo’ list. The panel shows users their current issues and activities, on which Standard Operating Procedures can be applied to manage complex and long-running. I-X also has a collaborative element to it, in that issues and activities can be passed between different process panels to enact a workflow across an organisation. The underlying model on which I-X is based is the <I-N-C-A> Constraints Model[11].

In a meeting scenario, actions raised in a meeting have a direct mapping to $iI-N-C-A_i$ activities. Actions created in a meeting specific I-X panel are passed onto the relevant

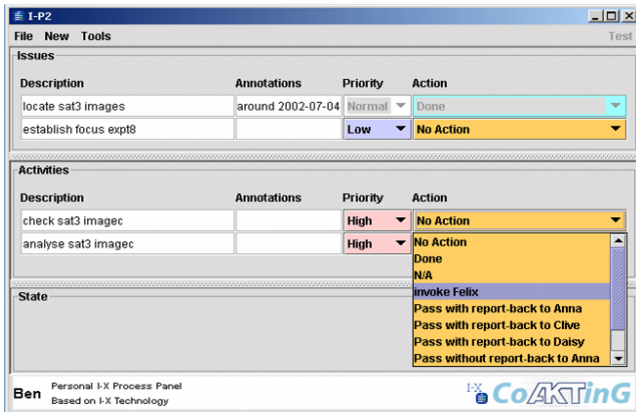


Figure 2: A I-X Process panel showing pending issues and activities

panel's for individuals, which, on completion report back.

2.3 Buddyspace

Buddyspace is a Instant Message client (based on the Jabber protocol) with features that enhance presence awareness. Specifically, it introduces the graphical visualisation of people and the presence on a image or map, as can be seen in figure 3. This allows for multiple views of collaborative workgroups and the immediacy or "at a glance" nature gives users a snapshot of a virtual organisation.

In a meeting, the instant message capabilities of buddyspace naturally provide a "back-channel" to the meeting, for example, conveying URLs of documents discussed or as a non-disrupting communication. For distributed meetings, such Access Grid meetings, the presence of individuals gives an extra indication of co-location (especially if the video-conferencing technology is failing). The back-channel can also be used for meeting control tasks, such as queuing of speakers and voting on issues.

For meeting capture purposes, logs of the channel conversations are made. Individual messages are timestamped and possibly examined to see if they control meeting specific messages.

3. ONTOLOGY

The Advanced Knowledge Technologies (AKT) project, with which CoAKTinG is affiliated, has developed a reference ontology [3] to describe the domain of computer science research in the UK, exemplified by the CS AKTive Space semantic web application. Within this domain, its vocabulary is able to express relationships between entities such as individuals, projects, activities, locations, documents and publications. For purposes of capturing meeting specific information, the reference ontology is already suitable for encapsulating:

- the meeting event itself
- meeting attendees
- projects which are the subject matter of the meeting

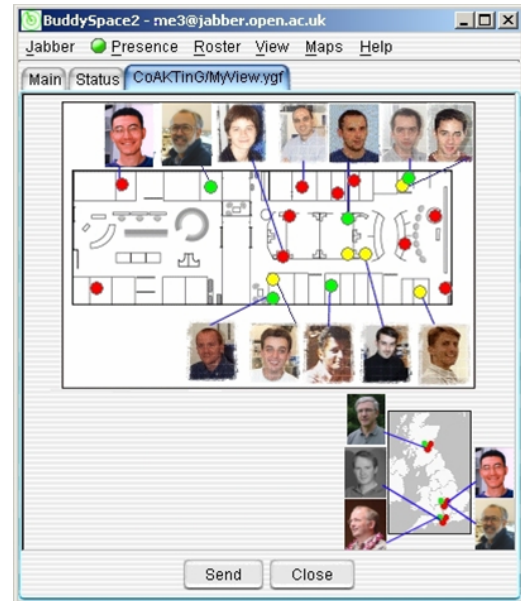


Figure 3: Buddyspace showing a virtual organisation and presence indicators

- documents associated with the meeting, including multimedia

For activities such as meetings, which we wish to index and navigate temporally, the way in which the ontology represents time is of particular relevance. The reference ontology contains the notion of an *Event*, which is a *Temporal-Thing* that can define a duration, start and end times, a location and *agents* involved in the event. More importantly, each Event can express a *has-sub-event* relationship with any number of other Events, and it is with this property that we build up our temporal meeting structure. Within the ontology there are also many Event sub-classes, such as *Giving-a-Talk*, *Sending-an-Email*, *Book-Publishing*, and *Meeting-Taking-Place*.

While the reference ontology provides a foundation for describing meeting related resources, the CoAKTinG meeting ontology (figure 4) extends the OWL version of AKT reference ontology to better encompass concepts needed to represent collaborative spaces and activities, including:

- time properties sufficient for multimedia synchronisation
- distributed gatherings to represent meetings which simultaneously take place in several spaces, both real and virtual
- exhibition of information bearing objects; e.g. showing a slide as part of a presentation
- compound information objects; e.g. to describe a presentation consisting of several multimedia documents
- rendering of information objects; e.g. JPEG image of a slide

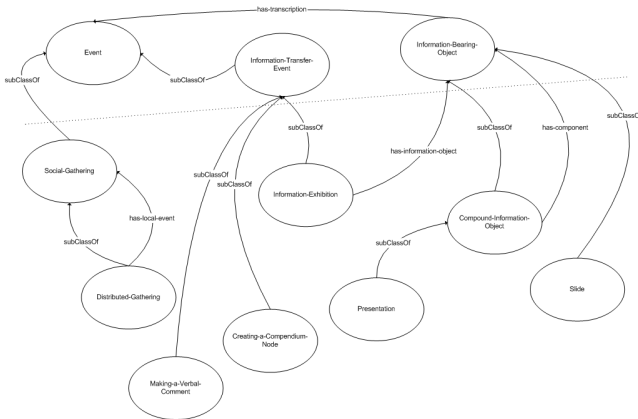


Figure 4: A simplified representation of the meeting ontology

- transcription of events; e.g. a video recording of a presentation, minutes of a meeting
- annotation of events; e.g. making a verbal comment, creating a Compendium node

When a meeting takes place we “mark up” the event with metadata - details such as those listed above - to build a structured description of the activities that occur. Through use of an ontology shared and understood by several different tools, we can lower the workload needed to provide usable and useful structure.

4. MEETING REPLAY

Once a meeting has taken place it can be useful to revisit the ideas and topics discussed. Traditionally, formal minutes are taken to record the salient points, but often these are too brief to be more than a simple aide memoire; in the typical CoAKTinG scenario (such as an Access Grid node) full audio and video logs are available, but conversely these are too verbose to be of practical use. We require the ability to select high-level points of reference from the meeting, then “zoom in” to view detailed records. e.g. a user sees from Compendium notes that a decision was made, but to understand the subtle reasoning behind that outcome wishes to view the video of discussion between participants.

Each meeting is described using RDF conforming to the OWL meeting ontology; this represents resources such as: the meeting time, location, attendees, audio/video recordings, any presentations given (and associated web viewable versions), and argumentation annotation from Compendium.

The Event / has-sub-event structure held within the RDF is mapped onto a more conventional time-line, which is automatically published using HTML and Javascript on a web site (figure 5). The user can navigate the meeting using the video timeline, or jump to a different point in the meeting by selecting a particular event, such as a slide being presented, or a Compendium node being created. By using the shared AKT reference ontology, we can also link to further information about resources held in other knowledge bases, e.g.

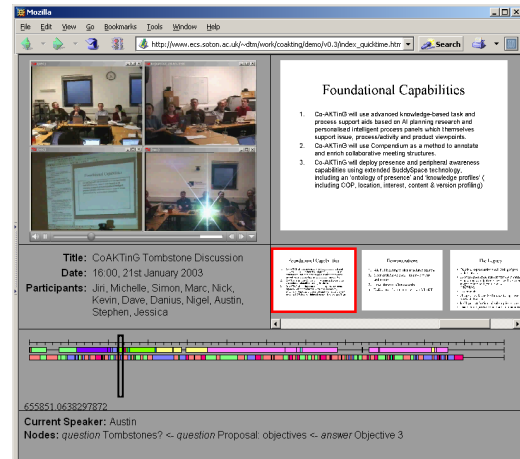


Figure 5: The meeting replay tool

when a person is referenced we link to information about them in the populated AKT triple store.

We populate the timeline with any temporally annotated information about the meeting that would aid the user in navigation. In CoAKTinG we have experimented with:

- Agenda item
- Slide exhibits
- Compendium node
- Speaker identification
- I-X activity(action item) creation
- Buddyspace chat

By providing all available information we hope to cater for the many activities and contexts of the user, in a seamless[4] manner.

We can categorise the information presented in the entire meeting replay in terms of the dimensions “structured” and “detailed”, as shown in figure 6. Video, for example, is high in detail, in that it captures the entire audio and visuals of the meeting. Structurally, it is relatively low, since although there is implicit structure (image frames and audio samples) these do not directly contribute to navigating the structure of the meeting. Video processing could be applied to segment the video into scenes but structurally this would not provide much more than Speaker Identification. The Agenda, conversely, is high in meeting structure, but relatively low in the details. Compendium captures a moderate level of detail in a highly structured representation.

5. CONCLUSIONS

This paper has introduced the tools being developed by the CoAKTinG project and identifies how they are typically used in meetings. Logs and exports from these tools are recast in a meeting ontology and provide a re-usable record

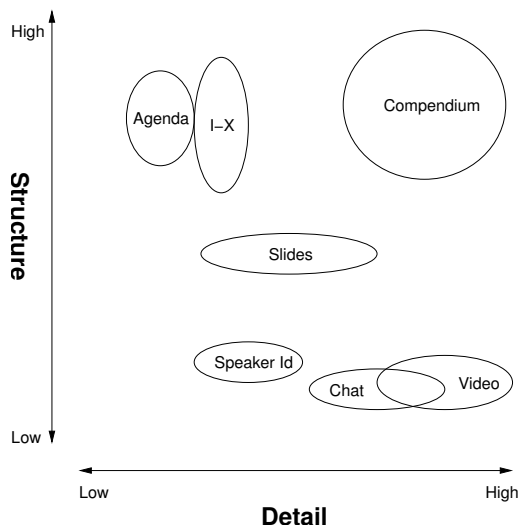


Figure 6: Meeting Detail and Structure of recorded sources

of the meeting. A meeting replay tool has been developed to allow users to navigate within meetings.

The information and knowledge created by the tools used during the meeting can be used to enhance the navigation of the replay. It's clear that there are many different sources of information, each with its own characteristics, and that each can be valuable to the user, whether as an aide memoir to meeting participants or to to enable browsing and summarisation to absent group member.

Gathering information from multiple sources in a single ontology presents interesting possibilities for implied structure about a meeting. Can we infer what a specific part of the meeting was about and use this to inform other knowledge bases to enhance queries about social networks and communities of practise.

Acknowledgments

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