FROM gIBIS TO MEMETIC

Evolving a Research Vision into a Practical Tool

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Abstract. Having developed gIBIS and QOC as *Argumentation-based Design Rationale* (DR) approaches in the late 1980s/mid-1990s, we report on the subsequent evolution of this DR paradigm. Our primary claim is that with robust hypermedia software being used by professionals in diverse contexts, representations of this sort are demonstrably both practical and useful to capture. The *Compendium* approach has maintained a strong emphasis on keeping the representational scheme as simple as possible to enable real time and asynchronous *Conversational Modelling*, an approach which extends Conklin's *Dialogue Modelling* with IBIS-templates specialised for systematic modelling. We have evolved an approach to tackling the DR capture bottleneck through a combination of human facilitative skill, hypertext structure, modelling methods, and an open technical architecture to assist interoperability. We present examples to illustrate the applications this work has found, in particular, we report on new work which integrates argumentation-based DR with design meeting video records, to create DR in the form of video annotated with IBIS-based semantics, accessible through the widely available Access Grid collaboration environment.

Introduction

In this workshop contribution, we will summarise how an intruiging 1980s research concept has matured to the point where there is an established community of practice spanning diverse organizational sectors, who are co-evolving both skills, work practices and software code. The title marks the maturation of the gIBIS research prototype developed by Conklin at MCC Texas, through its commercialisation in the early 1990s by Corporate Memory Systems, Inc. which led to the IBIS meeting facilitation skill now known as *Dialogue Mapping*, its extension in the mid-1990s with formal modelling methods at NYNEX Science & Technology labs (Selvin and Sierhuis) to create *Conversational Modelling*, the licensing of the Java software to the Open University's Knowledge Media Institute (KMI) to further develop and release the software application and code now known as *Compendium*, to today's current integration in the MEMETIC project, of Compendium with a high end internet video conferencing environment.

The objective of this paper is to update the software engineering community on how and why the QOC and gIBIS approaches we helped to create originally, have subsequently evolved into the current Compendium approach and tool. This position paper summarises more detailed accounts by Buckingham Shum, *et al.* (2006a; 2006b), to which interested readers are referred.

Compendium

Compendium[1] represents our current effort to take the raw conception of IBIS as proposed by Rittel (1972; Kunz and Rittel, 1970), and deliver it in a form where it can smoothly integrate in the 'matrix' of everyday tools and practices. Our technical objective is to provide a robust, open environment in the IBIS/argumentation-based DR paradigm, which can then be integrated with other DR paradigms and tools, such that services can be implemented over the extended-IBIS representational substrate.

Our approach to the capture problem is to invest rationale structuring effort primarily at the point of capture, validating it with the key stakeholders, which in the process serves their needs to understand each other, know that their viewpoint has been heard, and co-evolve a shared picture of the problem, possible ways forward, and the rationale for deciding which. This is supported by a software tool which can further lower the data entry overhead: data already entered in other key tools can be imported, and data entered in the rationale tool can automatically populate other tools, or generate documentation.

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[1] *Compendium Institute* software, publications, training and community resources: www.CompendiumInstitute.org

Compendium is a concept mapping software application. It comes 'pre-loaded' with node and link types for using the Issue-Based Information System (IBIS) and QOC. IBIS focuses a team on key issues, possible responses to these, and relevant arguments. Figure 1 shows the default node types, which include additional nodes beyond IBIS for *Lists and Maps* (containers for nodes), *Decisions*, *Notes*, and *References* that can hyperlink to open a web page or other document**.**

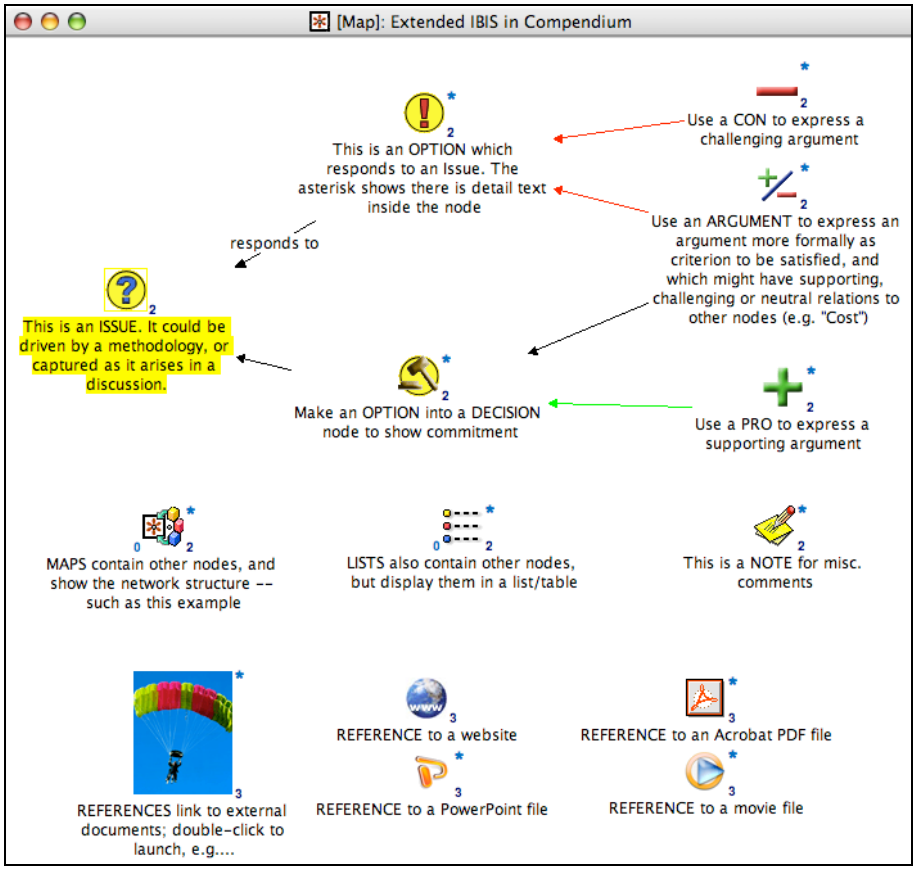

Figure 1: IBIS plus additional node types rendered in Compendium. Any application document or website can be dropped in to create a hyperlink. Nodes can contain text content, and links can be labeled if desired.

To instantiate this, Figure 2 shows a DR extract from a project meeting, in which an issue is raised, two options explored, and one justified.

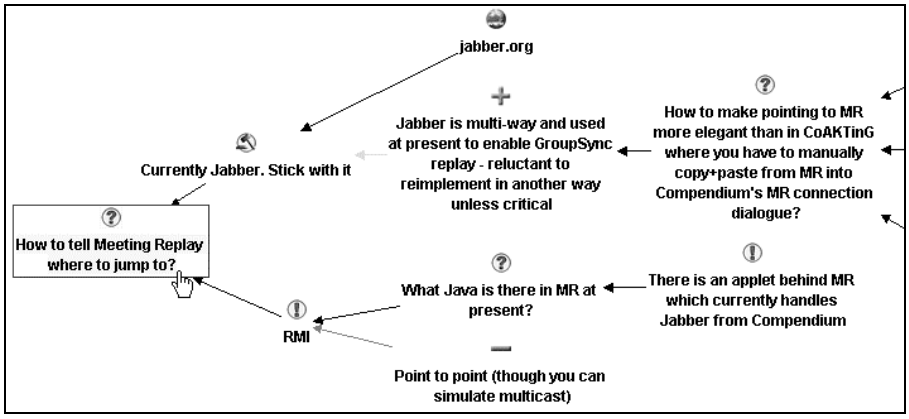

Figure 2. Extract from a software design meeting, in which Compendium is used to map issues, options, arguments, the decision, and a relevant website. (This meeting was an internet video conference, with Compendium viewed by participants via a desktop sharing application.)

As an example of Compendium in use for scientific analysis and decision rationale, Figure 3 shows an extract from a Dialogue Map created over several meetings, both face-to-face and virtual. As part of a large scale NASA Mars exploration field trial, co-located field geologists at a desert site (a Mars simulation) arranged rock sample photos for analysis. Colleagues (simulating a remote science team back on Earth) reviewed this on the internet and raised queries, linking them into the map as new Questions, Ideas and +/– Arguments. The Mars crew then responded (highlighted nodes). In other maps, discussions include links to voice annotations and web datasets. Compendium provided a shared visual focus on the contributions as they were made (particularly useful in the absence of other shared visual referents in virtual meetings), and a group-validated memory of how contributions connected. The Dialogue Map became the group's evolving, shared picture of their problem .

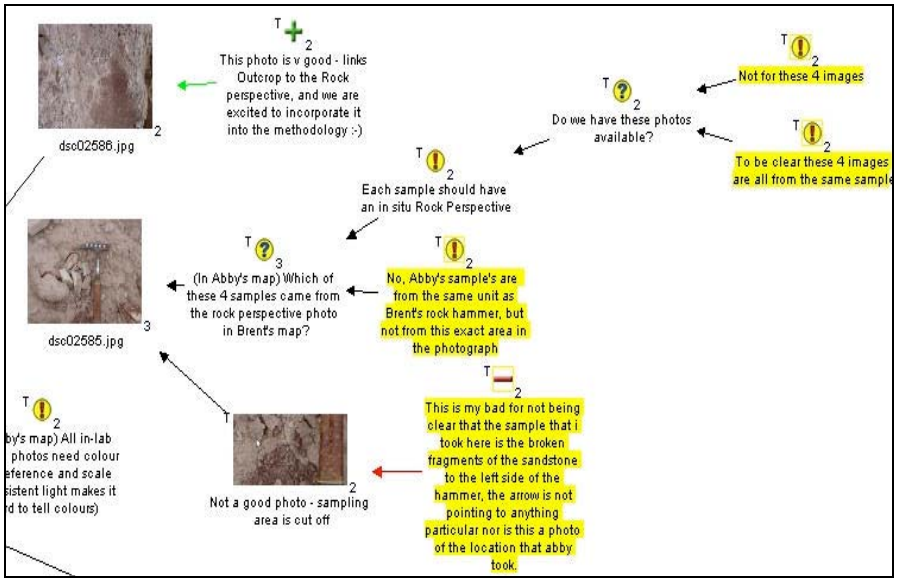

Figure 3: A Dialogue Map created in the Compendium software tool, illustrating its capabilities for integrating media resources with analysis and argumentation from different stakeholders (in both co-present and virtual meetings).

MEMETIC: IBIS-indexed, replayable video conferences

Many design teams now use video conferencing as an indispensable part of their work. In contrast, relatively little progress has been made on delivering robust, accessible tools for creating and flexibly navigating records of video conferences. Whilst not considered useful or even desirable in some contexts (e.g., for reasons of privacy, litigation, intrusiveness, etc.), in the many situations where it would be useful, there is a need for functionality that goes beyond simply replaying/skimming a digital movie.

The key idea we are exploring now is to exploit the richness of video records of design meetings to compensate for the terseness of Compendium IBIS maps; in turn, the maps can provide hyperlinked indices back into the video. This should enable us to recover rationale which is recalled episodically using the richness of cues that are known to underpin human memory. Consider the following accounts, typical of the ways we recall and recount significant meeting events:

- *Sam arrived late, at least 15 minutes in I think. By then Kim had already got agreement for her trip*

- *Anne announced she was quitting her job 5 minutes before we had to move back into the main session*
- *Joe's slide triggered negative vibes from the network guys*
- *It was a shame Lin had to go just before Sandra's killer demo*
- *We looked at that spreadsheet several times, and no-one complained once*
- *All Steve did was disagree with everything the marketing people suggested*
- *Millie was in full flow and then guess what – her connection went down*
- *Bill's a lousy chairman – we only covered half the agenda and even then we jumped all over the place*
- *There was a massive debate for about 20 minutes when everyone pitched in*
- *We made this decision quite early on, even though Jo said towards the end that it was doomed if we didn't take on board her report's findings*
- *The mood completely changed when Daisy arrived*

How can we provide support for recovering such 'critical incidents' from a recorded meeting? How would we record it, and how would we model and index it? The MEMETIC project (*Meeting Memory Technologies Informing Collaboration*: www.memetic-vre.net) has developed a toolkit for transforming meetings into persistent records which can be navigated in linear and non-linear ways, and which, as interactions span multiple meetings, can be traced and manipulated. While designed for distributed teams, a team can also physically meet in an AG Node room (explained next), in order to exploit MEMETIC's meeting capture and replay tools in a co-located context.

The Access Grid (AG) is an open collaboration and resource management architecture for video conferencing based on the metaphor of persistent virtual venues [www.accessgrid.org]. A team of researchers collaborating in, for example, a laboratory would expect to find there a set of tools available to help their work; so in a virtual venue, as well as video and audio feeds of all participants, applications and services to aid a specific virtual organization to work together remotely can also be accessed. The philosophy underlying AG is that each team has their own virtual venue in which they can store shared objects such as documents and data, together with shared applications.

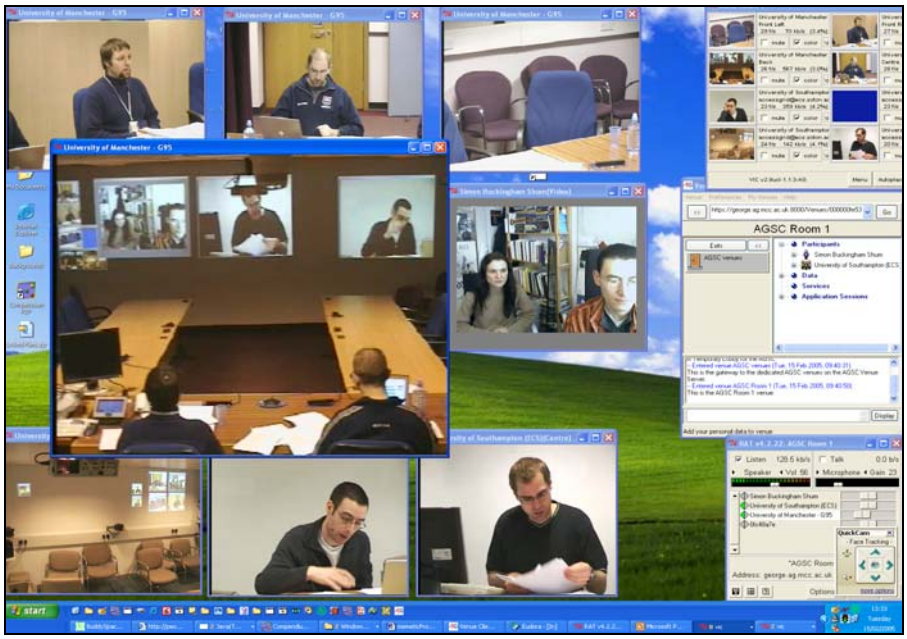

Figure 4: Participating in an Access Grid (AG) videoconference from a personal computer. The enlarged central video window shows participants at a 'venue' in a full AG 'Node' (see text).

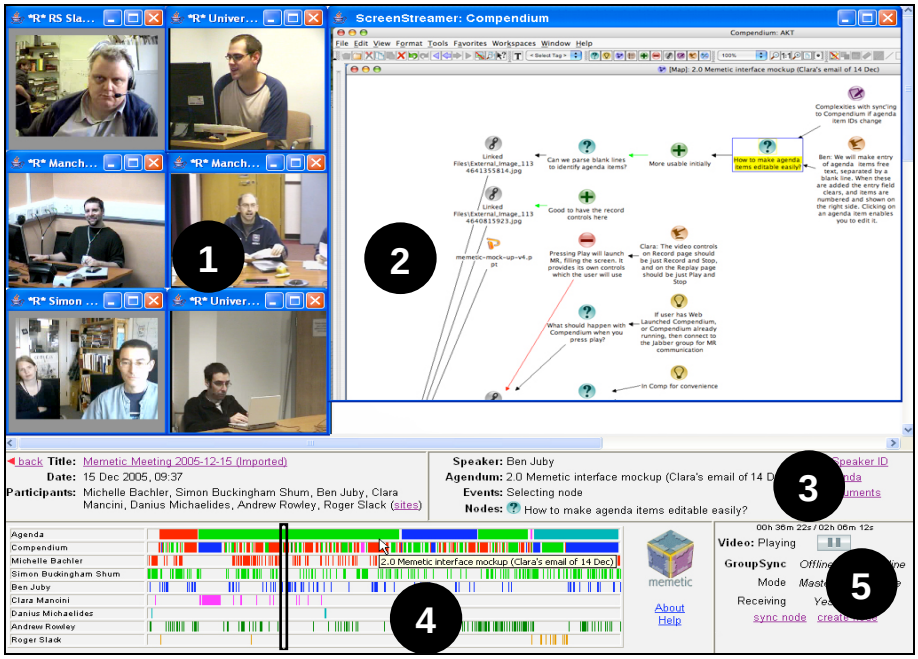

Figure 5: The Meeting Replay web interface in one possible layout.

An AG meeting can be attended via a single personal computer (Figure 4) or by going to a full AG 'Node', a designed space with very large display, multiple video cameras and high quality audio system.

With MEMETIC in place, DR is recorded in Compendium in the usual way during the AG meeting, but once uploaded to the MEMETIC server, The Meeting Replay interface (Figure 5) integrates the Access Grid videos and timestamped Compendium nodes. The meeting can then be navigated via the interactive event timelines shown in bottom frame, or from any node in a Compendium client (e.g., to play the video at the point when a particular argument was made).

In Figure 5, all windows are resizeable, repositionable and hideable. Key: (1) participant video windows; (2) shared screen from a participant (there may be >1); (3) status display showing current, Agenda Item, Compendium event (eg. selecting node) and the type/name of the last selected node (eg. How to make agenda items editable easily?); (4) interactive event timelines for Agenda Items, Compendium nodes, and Current Speaker. Clicking on a coloured bar jumps the video replay to the corresponding point in the meeting. In the initial software release, the Agenda Items and Compendium event lines are automatically generated, but Current Speaker must be manually annotated, if wished, from a radio-button interface. The final release will automatically generate event lines to show the active AG site based on the server traffic; (5) controls to Play/Pause, quit Meeting Replay, synchronise the view in the Compendium client to the map currently open in the meeting, create a new node in Compendium with a timestamp matching the current point in the replay, and couple or decouple the replay so that everyone viewing it sees the same thing (not active in the initial release).

Meeting Replays can be further annotated in Compendium by anyone in the project, to add missing material that might be useful, or to construct completely new navigational maps around the video, an affordance that we are now investigating to support distributed video data analysis. An affordance that we have yet to implement in Meeting Replay, but which we are beginning to consider, is navigation of interactions spanning multiple meetings. This is already possible in Compendium, whereby maps from discussions going back years can be retrieved (based on keyword, date, node type, author or metadata), pasted into a current discussion, or even actively cued by the interface by providing auto-completions of a new node's label as the user types it, based on matches to existing nodes (which might come from years back). Once these nodes are linked into a Meeting Replay archive, it will be possible for the user to select from multiple possible Meeting Replays in which a given node has arisen. Similarly, a search on the Compendium database will in effect be a search across multiple videoconferences.

To represent the contents of meetings, the Meeting Replay semantic web architecture uses an RDF triplestore, from which the Meeting Replay interface is generated. This opens up further possibilities for reasoning over multiple interactions and providing meeting memory services that mine, or act upon, the memory traces.

Conclusion

We have come a long way since Rittel first proposed IBIS as a notation for "argumentative design", and the early hypertext demonstrators such as gIBIS. Our experience in getting this to work in the real world – not always successfully – is in many senses the story of 'lessons learnt about the human factors of IBIS tools'. The vision of computational aids for design deliberation and capture when confronted by ill-structured, 'wicked' problems is an exciting one, but 'cool tools' alone cannot deliver this vision. The technologies of hypertext, digital video, and open standards for interoperability provide a powerful infrastructure, but to move from designers' fluid discussions to structured rationale representations, designers must become skilled with DR tools. Reluctance to persist long enough to gain some fluency with these new tools and their languages will result inevitably in the familiar complaints of intrusiveness. We have sought to show that the art and craft of design rationale – at least DR of this particular sort – is to know how to use the tools well enough that they are 'constructively disruptive', delivering immediate value to those using it, as well as supporting longer term memory.

Acknowledgements

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