CoAKTinG:
Collaborative Advanced Knowledge Technologies in the Grid

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http://www.aktors.org/coakting/

The *Advanced Knowledge Technologies* Interdisciplinary Research Collaboration (AKT IRC: www.aktors.org) is a 6 year, £7M project to develop knowledge management technologies, funded by the UK's EPSRC. The related *CoAKTinG* project, recently funded as part of the UK's e-Science Initiative on Grid computing [http://www.research-councils.ac.uk/escience/], aims to integrate and adapt AKT technologies specifically to support distributed scientific collaboration. As part of the AKT project's conception of the convergence of knowledge technologies and grid computing as the Semantic Grid [www.SemanticGrid.org], CoAKTinG will provide tools to assist scientific collaboration by integrating intelligent meeting spaces, ontologically annotated media streams from online meetings, decision rationale and group memory capture, meeting facilitation, planning and coordination support, scholarly argumentation, and instant messaging/presence.

These approaches are summarised below:

- **Smart spaces.** Scientists may wish to be in a variety of places when they are in communication with remote colleagues: experimental labs, meeting rooms, data analysis suites, or travelling. This component of the project will be combining Access Grid node spaces [http://www-fp.mcs.anl.gov/fl/accessgrid/ag-spaces.htm] with smart devices that support a variety of broad and narrow bandwidth connections to other people/devices. A smart space, as we conceive it, will recognise significant events in a meeting and associate metadata with the AV streams, described next, as well as enhancing shared presence.

- **Ontologically annotated audio/video streams.** Few researchers have the time to sit and watch videos of meetings; an AV record of an online meeting is thus only as useful as its indexing. Moreover, indexing effort must negotiate the cost/benefit tradeoff or it will not be done. Our prior work has developed ways to associate 'continuous metadata' (of which one form is hyperlinks) in media streams [Page and De Roure, 2001], capturing such events as slide transitions and providing support for navigation. We will now be embedding metadata grounded in one or more ontologies for scientific collaboration. Additionally, decisions and key discussions (as captured in Compendium – see below) can be recovered.

- **Planning and coordination.** We will be building applications using I-X Intelligent Process Panels and its underlying <I-N-CA> constraint-based ontology for processes and products [Tate et al, 2002]. The process panels provide a simple interface that acts as an intelligent "to do" list that is based on the handling of issues, the performance of activity or the addition of constraints. It also supports semantically "augmented" messaging and reporting between panel users. A common ontology of processes and process or collaboration products based on constraints on the collaborative activity or on the alternative products being created via the collaboration is the heart of this research. We envisage the creation of a library of process panels configured to support the issues, options and constraints associated with common types of meeting held by a given scientific group.

- **Meeting facilitation/rationale and group memory capture.** Whilst meetings are a pervasive knowledge-based activity in scientific life, they are also one of the hardest to do well. "Meeting technologies" tend either to over-structure meetings (e.g. Group Decision Support Systems), or ignore process altogether, and simply digitize physical media (e.g. whiteboards) for capturing the products of discussion. The *Compendium* approach suite of tools occupies the hybrid middle-ground – 'lightweight' discussion structuring/mediation plus idea capture [Selvin et al, 2001], with import and export to other document types.

- **Enhanced presence management and visualisation.** The concept of *presence* has moved beyond the 'online/offline/away/busy/do-not-disturb' set of simple state indicators towards a rich blend of attributes that can be used to characterise an individual's physical and/or spatial location, work trajectory, time frame of reference, mental mood, goals, and intentions. Our challenge is how best to characterise presence, how to make it easy to manage and easy to visualise, and how to remain consistent with the user's own expectations, work habits, and existing patterns of Instant Messaging (IM) and other communication tool usage. Working on the Jabber open source XML-based communications architecture, we will be extending its IM capabilities with 'ontology of presence' and 'knowledge profiles'. A prototype called *BuddySpace* [Eisenstadt, 2002] also adds visual and map-based 'buddy lists' to display presence information that is mapped onto visualisations, both geographical (e.g. a map of a building, or a region), and conceptual (e.g. a workflow chart or project plan, a design or experiment). The scale of the map can be altered to reflect anything from global positioning, to school and workplace office layouts, to experimental assemblies.

In the paper and presentation, we will present a scenario in which these tools are combined to support scientific collaboration of various types.

References

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