

EventsonLine: Books That Move The Way You Do

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Abstract

This paper introduces the EventsonLine technology developed by Turtle Lane Studios Pty Ltd. EventsonLine enables the delivery of multiple, parallel, synchronised media through a web browser. This facilitates access to complex information spaces beyond the capability of traditional books or e-books.

The paper discusses the ideas underlying the architecture, details some products already developed or under development and concludes with a discussion as to enhancements to the technology.

1 Introduction

Human communication involves a sophisticated blend of strategies and techniques to ensure the required bandwidth is utilised to communicate the message successfully. A sophisticated protocol has evolved to ensure that the communication achieves maximum effect.

"In the 1800's, readers of books were talked to - ...poets, novelists and essayists addressed us all cosily as "Dear Reader" or "Gentle Reader". We felt valued as the author's friend. We were engaged jointly, in an act of complicity". (Dorner, 1993).

Dorner's argument continues, reading is an act of entering imaginatively into what the author is saying. The reader was someone to woo and writers considered carefully how to address the reader. There was the expectation that the reader would be led by the writer through the space, following the argument through its, sometimes, tortuous path to the conclusion. There was no notion of the reader using the writer's text beyond taking parts of it to pieces to examine ideas and techniques.

The medium that reached some sort of level of standardisation was paper. Although scrolls and codexes continued to exist, folded paper became the distribution medium of choice after Caesar first folded a roll into pages for dispatch to his troops (Manguel, 1996). The codex was adopted by the early Christians because it was easily hidden in their robes, pages could be numbered to allow quicker access and many codexes could be bound into convenient packages.

The development of codexes was an end of a long development including the separation of texts into words and sentences - most early scripts used no such subdivisions. The early scribes needed very few of such visual aids as they were intimately familiar with the texts they were transcribing. The visual aids evolved to assist those with poor reading skills, an evolution that led to a better understanding of the texts.

Paper provided the perfect medium for the author to capture their prose and the reader to absorb the message in a variety of circumstances, from walking in the country to sitting in the bath.

Recently, the e-book/e-publishing phenomenon has provided a further branch to this evolutionary tree.

We have seen the development of *electronic paper*, a digital simulacrum of the traditional codex retaining many of its characteristics. Like traditional codexes, e-books are paginated facilitating access, retain chapter structures described by table-of-contents. In fact, they are designed to act just as ordinary books.

Yet, the traditional way of addressing the reader has gone with the growth of the reader's use of the text. The 'oi-you' address is pervasive today, acknowledging that the reader is

there somewhere and is being manipulated (Dorner, 1993). Oi-you is seductive because the writer has come to consider the reader as "someone to be manipulated, someone who wants a quick consummation without any of the preliminaries" (Dorner, 1993). Arguments are undressed from the first paragraph, details are bullet-pointed, numbered, summarised, displayed in charts and beguiling graphics. Texts have been broken into reusable chunks.

This, in turn, has led to a change in the reader's attitude. Mass strategies have taken over where the amount of information has grown too large to absorb. Readers no longer read texts but scan looking for what is useful to them, in turn becoming end-users. Content has become information, a product people consume.

We have reached a Rubicon¹ in this evolution.

Multimedia technologies provide a sophisticated mechanism to communicate a message to a multitude of readers in a personalised fashion. It allows for readers to personalise their 'books' in ways previously not thought possible or desirable. The message moves - the book moves - as the reader moves.

The traditional way of writing and reading is being replaced by new mechanisms, involving the inter-blending of multiple synchronous media.

2 EventsonLine

EventsonLine (EOL) is an architecture developed to provide rich multiple media environments. It enables the provision of synchronised audio, video, image and text in conveying a message to an end-user. Users can choose which medium best conveys the message for them and can determine how much of the message to access.

EventsonLine products can be delivered through a standard browser interface across Macintosh and PC platforms. They can utilise the Quicktime, Windows Media and Real Video technologies. Products can be delivered via CD ROM or through the web or a combination of both.

The EOL architecture is depicted in Fig.1, multiple parallel synchronised channels of information through which a user can roam at will or be guided by appropriate 'tour guides'.

¹ When Roman legions were sent away from Rome, they could only turn back before crossing the Rubicon river. Once crossed, the legion was committed to the given task and any turning back would have ended in disgrace to the commander.

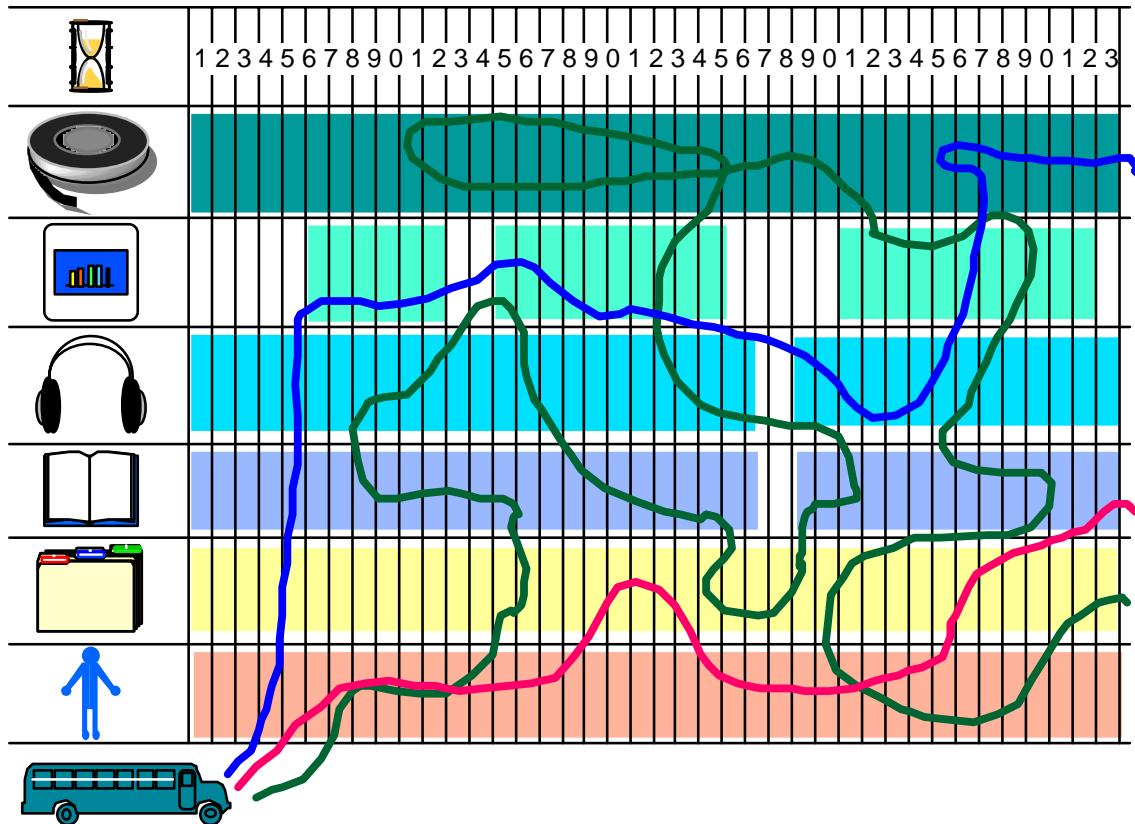


Figure 1 - EventsonLine Architecture, multiple synchronised parallel channels of information

Information in any channel need not be continuous - in a conference there are silent periods, breaks, etc. However, at any point in time where the message occupies multiple channels, these must remain synchronised throughout the user's access. This, in itself, provides special difficulties when it comes to authoring such content. For example, decisions need to be made with respect to the treatment of transcriptions, will they be verbatim or edited and if edited then edited how much?

To date, EOL has been utilised in a number of projects. We have built an electronic proceedings of a one-day workshop on Electronic Publishing for the Australian Vice Chancellors' Committee(AVCC), a walk through an art show of the work of Yvonne Boag (<http://showcase.cadre.com.au/eventsonline/yoagRM/>), the session on digital libraries at the Online and On Disk conference, 1999, (<http://showcase.cadre.com.au/olod99/>), and a CD ROM for the Federal Department of Communications Information Technology and the Arts (DCITA) titled *The Digital Environment: New Technologies and Australian Culture*. We are currently building an e-commerce and education web site that will utilise the EOL technology to provide a human interface to the material being presented. The Digital Environment CD ROM contains the complete capture of a one-day conference and over twenty megabytes of other documentation related to the digitisation of Australian cultural material with special

mechanisms for providing access to this disparate material in a way that ignores the media used in its recording.

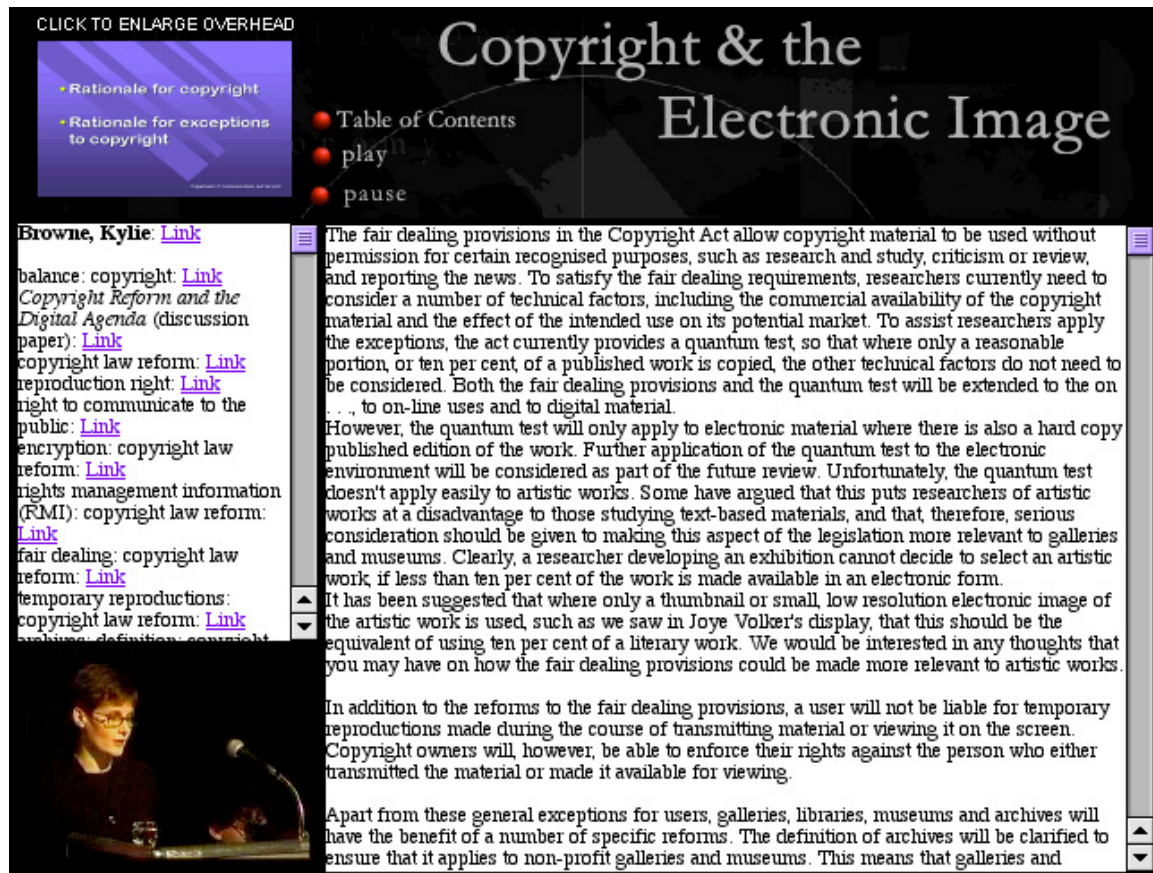


Figure 2 - A presentation from an online conference. Note the various channels of information, the video and audio, the transcript and the overhead slide on view at that time. In addition, the navigation facility provided through the topic list for this presentation.

An EOL project is developed by capturing the message in as many media as possible or desirable. Thus for a conference, we record the speaker, all questions and answers, the overheads used, the papers normally distributed as part of the proceedings. All this material is digitised and edited to remove any unwanted artefacts, such as 'ums and ahs', and cleaned up, such as sharpening images, compressing video, etc. All audio is transcribed using our own proprietary transcription tool, TLSTranscription, that enables the use of digital audio without dubbing to audiotape for use on conventional transcription consoles. As shown in figure 3, TLSTranscription produces transcriptions already marked up for web delivery and containing specific SMPTE timecode markup on each paragraph, added automatically by the tool. The timecodes are used as part of the indexing process. The tool enables a transcriber to reduce the rate of the audio stream facilitating uninterrupted typing.

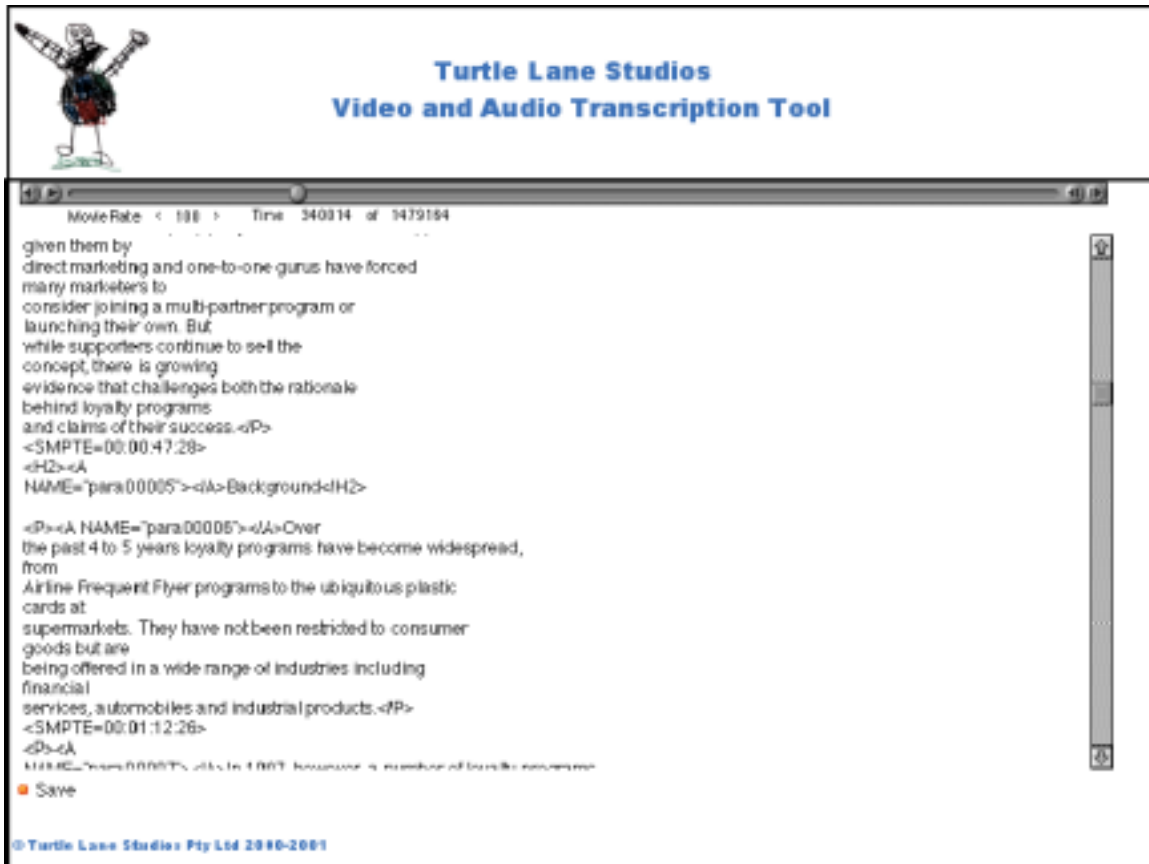


Figure 3 - TLSTranscript tool. Note the transcript is already marked up for web delivery with appropriate SMPTE timecodes on each paragraph and heading styles. Paragraphs are marked as our indexing granularity is the paragraph.

Once all source media are captured and edited into 'camera-ready', they are passed into the indexing process that results in an index for each information object. Index entries are stored with each object and can be combined to form more abstract objects. So for a collection of page objects, we can automatically generate indexes for each page, chapter, book, bookshelf, library, etc. The index captures each concept being discussed in all media and enables the reader to select a concept or theme and a set of media with which to engage the concept or theme. Indexes of this form are also simply amalgamated so as to encapsulate other disparate material. For example, it is a fairly simple process to merge indexes for two presentations to form one conference index and then to include other conferences.

```

<HTML>
<HEAD>
<TITLE>programs... or buying customers?
</TITLE>
Target="para00007"
  IndexAs="Fly Buys, questioning
of",SortAs="Fly Buys, questioning of",HelpAs="Fly
Buys, questioning of",HelpTitle="Untitled"
  IndexAs="Ford/Citibank credit card,
cancelled",SortAs="Ford/Citibank credit card,
cancelled",HelpTitle="Untitled"
  IndexAs="loyalty programs, re-evaluation
of",SortAs="loyalty programs, re-evaluation
of",HelpAs="loyalty programs, re-evaluation
of",HelpTitle="Untitled"
  Target="para00008"
  IndexAs="airlines, frequent flyer
programs",SortAs="airlines, frequent flyer
programs",HelpAs="airlines, frequent flyer
programs",HelpTitle="Untitled"
  IndexAs="cost, loyalty
programs",SortAs="cost, loyalty
programs",HelpAs="cost, loyalty
programs",HelpTitle="Untitled"
  IndexAs="frequent flyer programs,
cost",SortAs="frequent flyer programs,
cost",HelpAs="frequent flyer programs,
cost",HelpTitle="Untitled"
  IndexAs="loyalty programs,
cost",SortAs="loyalty programs,
cost",HelpAs="loyalty programs,
cost",HelpTitle="Untitled"

```

Figure 3 - Example of index entries for a page object. Note, the entries stored as meta-tags within the HTML markup itself and thus follow the object throughout its lifecycle.

The index for any object is displayed separate from the object's contents, as shown in figure 2. This is deliberate on our part as investigations have shown that users get easily confused by the layering of navigation structures over content, as seen in conventional web pages. On encountering such an anchor in a document, the author is suggesting to the reader that they follow this link as it contains interesting, useful information. Many readers usually follow this link which gets them to a new page containing more links which they follow, etc. This soon results in reader confusion, where they can not remember why they are in any particular place on the web nor how they got there, or how to get back. Earlier research by the author, involving the Intellitext software, investigated the notion of paths as a metaphor for navigating through information space (Jansen & Bray, 1993, Jansen & Ferrer, 1995). This research indicated that a separation of the content from the navigation structure was desirable. This enables the reader to focus on the content at hand or to navigate as they see fit but with a clear distinction between each activity.

The screenshot shows a web browser window with the title "Document Archives". The navigation menu includes "Table of Contents", "Back", "Search", and "Main Menu". The main content area displays an alphabetical index of document collections, with entries for "AA-AB", "AC-AK", "AL-AMCOR", "AMCOS", "AMCOT-APQ", "APRA", "APRB-AR", "AS-AT", "AU-AUSTQ", "AUSTR-AUSTRALIAR", "AUSTRALIAS", "AUSTRALIAT-AVCR", "AVCS", and "AVCT-AZ". Below the index, there is a list of document collections with their respective dates and links:

- AAP (Association of American Publishers), *Metadata & ECMS Decoder* (May 98), [Link](#)
- AAT (Art & Architecture Thesaurus), *Metadata & ECMS Decoder* (May 98), [Link](#)
- ABA (Australian Broadcasting Authority): website, *Metadata & ECMS Decoder* (May 98), [Link](#)
- ABEC (Australian Electronic Business Centre), *Metadata & ECMS Decoder* (May 98), [Link](#)
- ABN (Australian Bibliographic Network): website, *Metadata & ECMS Decoder* (May 98), [Link](#)
- Aboriginal Art in the Age of Reproductive Technologies* (exhibition): *Copyrights #16* (18 April 1996): [Link](#)
- Aboriginal and Torres Strait Islander art:
 - Simpson Report* (July 95): copyright collecting societies: role, [Link](#)
 - Copyright Guidelines for Museums & Galleries* (Mar 98):
 - finding copyright owners, [Link](#)
 - copyright: special issues, [Link](#)
 - Copyright & the Electronic Image Forum* (July 98):
 - collections:
 - Jonas, [Link](#)
 - Museum of Sydney: Andringa, [Link](#)
- Aboriginal and Torres Strait Islander intellectual property: Martin, *Copyright & the Electronic Image Forum* (July 98), [Link](#)
- Aboriginal and Torres Strait Islander Library and Information Resources Network (ATSILIRN): website, *Metadata & ECMS Decoder* (May 98), [Link](#)

Figure 4 - Displayed index to an information space. Note the index is sorted by time enabling the following of themes of interest over time showing how a particular topic has evolved. The index entries cross traditional document boundaries and can incorporate many EventsonLine projects. In this case, the entry for Aboriginal and Torres Strait Islander Art encompasses both traditional documents in digital form as well as the Copyright and the Electronic Image forum.

3 Areas For Development

The EOL development, although successful in delivering product, has highlighted a number of areas that need to be addressed to ensure long-term commercial viability.

3.1 Standards

The main concern is the lack of universally adopted cross-platform standards. We have needed to develop our video solution for the three common technologies, Quicktime, Windows Media and Real Video. Although not a major problem, a single solution able to be played across any technology would make the overall job simpler. The announcement by Real that they can now play Quicktime formats is the first step in achieving this small nirvana. We can only hope that either each of the vendors will support the other formats or a true universal format will arise.

3.1.1 SMIL

Synchronised Multimedia Integration Language (SMIL) is an initiative driven through the World Wide Web Consortium (<http://www.w3.org>) that is developing a simple universal markup scheme for synchronising multiple media data streams. The media to be

synchronised are identified with their synchronisation information in a simple language, akin to HTML. This meta file can then be loaded onto a web server and when downloaded to a browser or media player, for example, Quicktime Player, the media will be delivered to the client's workstation.

SMIL, currently at version 1 with version 2 in development, works well for simple synchronisations. However, the implementation of the SMIL language varies across platforms and software applications. Difficulties in implementations means that different versions of the SMIL file may be required to handle cross-platform difficulties. For example, the Quicktime implementation of SMIL, up to and including Quicktime version 4, shows an almost exponential loading time for a many-parallel SMIL product. Converting from many-parallel to many sequential reduces load times to an acceptable level. This however, requires a change in the way of thinking during authoring.

There are an increasing number of SMIL tools available with the GriNS system (<http://www.oratrix.com/GriNS>) being common. GriNS has two flavours, an editor and a player. It is cross platform, being supported on Macintosh, PC and Unix (Irix, Solaris and shortly Linux). Another cross-platform tool is Fluition (<http://www.smilsoftware.com/>). Each has advantages and disadvantages but in our recent work, we have tended to a basic text editor to write our SMIL code. This indicates the state of development of SMIL akin to early HTML.

However, SMIL promises to shape up in the near future as the way to author these types of applications.

3.1.2 Streaming Video and Audio

Following on from the discussions of SMIL above, the disparity in streaming video presents a considerable barrier to adoption of these types of systems. The three main players, Apple, Microsoft and Real remain isolate in their implementations of streaming video. The RTSP protocol has been adopted by Apple and to some extent by Real but Real remains loyal to their proprietary real Video and Audio formats. Microsoft has its own format, Windows Media, which seems destined to remain separate.

Yet for the types of synchronised multiple-media products being discussed, streaming media are a necessity and thus any development needs to consider the demographics of the user base. This leads to levels of alienation of users, with some users refusing to install Apple or Microsoft or Real products. This requires the developers to either choose the technology with the greatest reach or the technology most compatible. Either way, the result is a compromise.

It seems difficult to access figures of streaming video technology adoption. In a recent email to the Quicktime talk digest (quicktime-talk-request@lists.apple.com), Philip Hodgetts (philipmh@learndynamicmedia.com) wrote that there have been 100 Million downloads of the Quicktime software, version 4, with 20 Million Macintosh users and 80 Million Windows users. These figures indicate that Quicktime adoption is increasing especially for cross-platform products.

3.2 Browser behaviour

We have noticed that browser behaviour is most inconsistent across platforms and across browser versions. Support for legacy technology seems patchy with a major impact on long-term access to digital documents (see the discussion on preservation below).

The introduction of Java has, unfortunately, worsened the situation. The war between Microsoft, HP and Sun on what is and what is not Java merely sullies the attempts at standardisation. This has led, in our situation, to an explosion in Java code catering for individual Java implementations, across browsers and across platforms. From our perspective, all this increases R&D cost for very little actual return.

A consistent and predictable browser behaviour would resolve many issues in this area.

3.3 Toolkit

Our developments of commercial product have led us to a R&D activity in building our own toolkit to simplify the building of our multiple media product. To date we have utilised various products from various vendors and had to integrate at the content level. Our aim is to integrate at the tool level and to this end we have begun the development of our own toolkit. TLSTranscription, mentioned above, is our opening foray into this area. Other aspects of the toolkit are already on the drawing board, including a SMIL editor. The integrated toolkit will simplify development of synchronised content by enabling authors to focus on the content and its behaviours with little thought, in the early stages, for the delivery vehicle.

3.4 Realtime development

Our marketing activities to date have indicated a viable market for these products providing the delivery schedule is very quick. The toolkit we are developing aims to cut delivery times to the beginning of the next day for an event happening today.

To this end, the toolkit must cut out multiple handling of the content. It must enable processing of the information streams in real time. So, transcription, editorial and indexing must become real time activities. Indexing and editorial can already be accomplished in real time, but indexing is a different problem.

We propose a phased delivery of indexes, with the initial index being more akin to an expanded table of contents. This would be replaced with more sophisticated indexes as they become available.

3.5 Navigation Interfaces

The R&D we have undertaken to date indicate that for simple, limited, information spaces, conventional indexes are a powerful mechanism for providing consistent navigation separated from the actual content. However, when such spaces become more complex, new mechanisms are needed. For example, an index entry limited to an A4 page or a screen full is comprehensible by most users. However, once that limit is

exceeded, then problems occur. The conventional alphabetical mechanism breaks down as the information density increases.

Different mechanisms are required, such as mind maps, topic maps, concept maps, 3D indexes, etc.

These mechanisms are all a type of semantic net, diagrammatic representations involving labelled nodes and arc to represent things being considered and their inter-relationships. *3D indexes* go one step further and link these types of graphs with index structures through hyperlinks. An example of a 3D index is the Macmillan Encyclopedia of Life Sciences (<http://www.els.net>).

Argument mapping takes a slightly different approach. In an argument map, the map displays the progress through an argument by linking various components of an argument, such as the basic premises, warrants, conclusions, etc. This was introduced by Toulmin (1958) and has seen steady improvement since.

Most of these topics come together in Thagard (1993) describing systems for the mapping of conceptual structures in a computational format. The work described aimed at explaining how major conceptual revolutions, such as Lavoisier's oxygen theory, or plate tectonics, evolved and came to be adopted.

Each of these techniques presents an interface for navigating through non-trivial information spaces. Ross (2000) claims these are exemplars of efficient data retrieval, easy to use indexes with novel links to related subjects, something exciting and interesting, yet quick and effective.

Time alone will tell. However, they are an area worth investigating.

3.6 Preservation

Probably the most important yet neglected aspect of digital information spaces, preservation is an as yet unknown area.

Much activity is occurring in this important area, spearheaded by the Australian PADI initiative, driven by the National Library of Australia (<http://www.nla.gov.au/padi>).

As a developer of complex multiple media information spaces, our business model hinges on ensuring continued access over time. At present, no technology can guarantee that objective. This is a cause for serious concern. To that end, all our projects involve some aspect of preservation. However, it is fair to say that we do not have an answer to this problem and look forward to working with others in this field to place ourselves and Australia at the forefront of this important area.

4 Acknowledgements

We acknowledge the involvement of the following people and organisations in the development of the EventsonLine technology: David Hegarty (CEO, CADRE Design), Alan Walker (indexer), Dr. Graham Barwell (University of Wollongong) and Glenda Browne (indexer).

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6 The Author

Dr. Bob Jansen has over twenty years experience in the IT industry incorporating both the private and public sectors.

Before starting his own company, Turtle Lane Studios Pty Ltd, he was Principal Research Scientist at the CSIRO Division of Mathematical and Information Sciences where he was Program Manager of the Knowledge-Based Systems program and led numerous projects in electronic publishing and advanced information systems.

Since splitting from CSIRO, he led the development of the EventsonLine technology based on his EventsonLine architecture. He held the position of Consulting Director, Research and Development for Impart Corporation, one of the Federal Government's Cooperative Multimedia Centres and was a member of the Standards Australia working party developing standards for digital libraries and a founding member of the PADI initiative.

His latest developments include HackerAlert, an innovative service for monitoring web sites against hacking.