FINAL GRANT REPORT

to

The Andrew W. Mellon Foundation

Standards Development Workshops on E-Book Annotation Sharing and Social Reading

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National Information Standards Organization
# Table of Contents

Summary ........................................................................................................................................... 2
Description of the meetings ................................................................................................................ 3
Outcomes ........................................................................................................................................... 6
Conclusion ......................................................................................................................................... 8
Appendix A – Meeting attendee list ................................................................................................. 9
Appendix C – Link to presentation slides ......................................................................................... 10
Appendix D – Frankfurt meeting minutes ......................................................................................... 12
Appendix E – San Francisco meeting minutes .................................................................................. 24
Summary

In June 2011, The Andrew W. Mellon Foundation awarded the National Information Standards Organization (NISO) a grant of $48,500 to fund the project *Standards Development Workshops on E-Book Annotation Sharing and Social Reading*. The goal of this project was to organize two meetings to discuss the current state of annotation of digital books on a variety of platforms. The first of the two meetings was held in Frankfurt, Germany, prior to the start of the Frankfurt Book Fair and the second was held in San Francisco, California, prior to the start of the Books In Browsers Meeting hosted by the Internet Archive. Both meetings were held in October 2011 on the 10th and 26th respectively.

The meeting in Frankfurt drew 19 participants. The meeting in San Francisco drew 33 participants. Despite the lower than expected turnout, the meetings were tremendously successful in terms of advancing the conversations about community needs for annotation. The conversation in Frankfurt focused more on the policy, goals, and business issues surrounding e-book annotation. The meeting in San Francisco focused more concretely on the technical infrastructure and syntax needs of a standard for annotation systems. Although slightly smaller than anticipated, the meetings did generate lively conversations and helped to formulate the scope for the new work item that was put before the NISO voting membership. In addition, the gatherings brought together the technical experts, many of whom have agreed to join the working group that will develop the standard on e-book annotation.

Among the outcomes for the meetings were an increased awareness of the need for a standard for locating reference points in digital texts as well as a structure for sharing those annotations across reading systems. Another outcome was the launch of a NISO working group to develop these structures as a U.S. national standard. The meetings also advanced the technical conversations related to annotation sharing.
Description of the meetings

Frankfurt Meeting

The meeting in Frankfurt was held at the Frankfurt Messe, rather than at the Sheraton by the airport as had been proposed. This event location was more convenient for the participants and also less expensive, since the Buchmesse waived the room rental fee. In addition, the catering was marginally less expensive. Unfortunately, Peter Brantley had to cancel his participation at the last minute, so was unable to present as expected. Todd Carpenter prepared his slides and spoke on his behalf, in addition to his own planned introduction. Following a welcome, Mr. Carpenter spoke about the overall value of annotation, why digital reading systems pose challenges for annotation, and what the goals of a social reading system would be. Mr. Carpenter then presented on the work done by Rob Sanderson on the Open Annotation Collaboration (OAC). (A representative from the OAC was also not able to join in the meeting in Frankfurt.) This presentation highlighted a web-centric Resource Description Framework (RDF) model for annotation and its apparent value as a basis for annotation structures. Following a discussion of the OAC model, Markus Gylling, Chief Technical Officer at the International Digital Publishing Forum (IDPF) spoke about the work on annotation location that has been undertaken by the IDPF and its constituencies. Mr. Gylling discussed the pros and cons of two distinct approaches to inter-publication linking. The first strategy would be to use “loose links” that are fuzzy and degradable but provide robust links to any instance. The alternate approach is to use “strong links,” which are explicit and verifiable to an exact document; however, this approach is more fragile.

Following the initial presentations, there was a round of product demonstrations from organizations that are using annotation services. Presentations included: Henrik Berggren for Readmill (readmill.com); Marc Köhlebrugge for OpenMargin (openmargin.com); and Aquiles Alencar-Brayner for Codex Sinaiticus (codexsinaiticus.org) at the British Library. Each has a unique use case and approach to annotations.

Following these demonstrations, the meeting then entered into a broad discussion of challenges and barriers to open annotation. Given the mix of participants, the conversation ranged primarily around business and policy implications. Work identification and the linking of manifestations of a work were the focus of a significant portion of the roundtable conversation. Sharing of e-book annotations is a use case for the application of an industry-wide registry of work identifiers. The International Standard Text Code (ISTC) could be useful in this regard, especially since it is meant to identify a specific text or a work, not its manifestation.

Digital right management (DRM) and copyright were also discussed. One concern expressed by some publishers is that if the text snippets were exchanged in some standard form, then it might be possible to recreate the text based on those extracted annotation texts. In addition, the challenge of getting an annotation system to work around DRM file wrapping was perceived as a barrier to functionality and adoption.
Another locus of discussion during the roundtable was the appropriateness of multimedia referencing as part of the specification. One might envision a system that works specifically with text, but annotation of multimedia, such as images, video, or sound are also important use cases for a robust annotation system.

Minutes of the Frankfurt meeting are included in Appendix D of this report.

San Francisco Meeting

The meeting in San Francisco was held at the Marine Memorial Club hotel, as proposed, and drew 33 participants. For a variety of reasons, the meeting in San Francisco brought together a larger number of participants and was, generally speaking, a more technical conversation than in Frankfurt. In part, this was due to the type of attendees at the meeting held in conjunction with the Annotation workshop. Frankfurt normally draws a more sales management, rights, and executive focus. The San Francisco Books in Browsers meeting brings together a more technically-oriented and entrepreneurial group of participants.

The schedule at the San Francisco meeting followed the same general outline as the Frankfurt meeting. Todd Carpenter began the workshop by outlining the overall scope and aims of the project and the need to focus on achieving a measured but narrowly scoped project in the short-term, but with an eye toward extensibility to broader media in the near future. He also discussed the outcomes of the Frankfurt meeting conversations, especially the emphasis on copyright and work identification as critical elements of an annotation sharing framework. Peter Brantley made some opening comments about the importance of annotation and the need for standards work in this space before implementations and approaches become fragmented.

Following Mr. Carpenter’s and Mr. Brantley’s remarks, Rob Sanderson (Los Alamos National Laboratory) provided an update of the work done by the Open Annotation Collaboration (OAC). Dr. Sanderson described OAC’s approach as web-centric and open, in which everything has a URI identifier and therefore sharing of those URLs via any web transfer protocol should be possible. Among the benefits of the OAC approach is its scalability and its representation and transport using a variety of currently accepted web protocols.

The next speaker to the group was Bill McCoy, Executive Director of the International Digital Publishing Forum (IDPF), who discussed the status of EPUB 3 with respect to annotations and linking. Mr. McCoy discussed canonical fragment identifiers (CFIs) and their potential application for e-books and EPUB 3, as well as some of the problems with CFIs for annotation. He reviewed some of the conversations that took place within IDPF’s exploration of annotation, before it was tabled in favor of more pressing work on the revision of EPUB. Some of the approaches considered by IDPF were: 1) the development of a custom scheme—but the failure of a custom XRI (Extensible Resource Identifier) scheme loomed large; 2) the use of persistent identifiers—e.g., PEIs (PURL-based EPUB Identifiers) or DOIs (Digital Object Identifiers), which pose some advantages to a Uniform Resource Locator service model, whether hosted by IDPF or in some distributed manner; and 3) the application of other link resolver services, such as OpenURL.
Mr. McCoy stressed that IDPF has global interest and will be watching the progression of the NISO work closely. He stressed that IDPF supports this work and wants to help where and when it is appropriate.

Following these initial four presentations, there were a series of “lightning talks” of five minutes each from participants describing their organization’s services and ideas. These presentations were given by:

- Ricky Wong, Mobnotate
- James Bridle, BookTwo
- Henrik Berggren, Readmill
- Ken Haase, beingmeta
- Laurence Bricker, Social Book
- Brian Hoffman, NYU Libraries
- Rob Sanderson, Los Alamos National Laboratory
- Corey Menscher, Findings

The meeting then turned to an active technical discussion of what a system for annotations would involve. This wide-ranging conversation took up most of the rest of the afternoon. The conversation centered on several key points:

- What kind of architecture should be used
- Distrust of quoting passages / distrust of offsets
- How to define fragments – use of a single method or different approaches for different media
- Serialization of fragments
- Valuable high-level properties that will ensure robustness in the face of change
- Exact matching / rough matching

The consensus of the group was that the location problem was the most challenging and that the best approach would be to use as many different sets of constraints as possible that can help locate the relevant passage. Various strategies for locating a point in a digital reflowable text—including percentage, absolute character counts, IDs, XPath, content, hashes—can all work to some extent, but a good way of ranking them is needed.

Again, as in Frankfurt, the question of how to navigate and link among different editions and different manifestations of the same work across different reading systems was seen as the biggest challenge. It was hoped that some identifier, such as the International Standard Text Code (ISTC) might help to address this issue.

The meeting ended with a discussion led by Nettie Lagace of next steps and the activities of the NISO working group that will be formed as an outcome of these two meetings. Several of the participants volunteered to work on the project as it moved forward.
Minutes from the San Francisco meeting are included as Appendix E of this report.

Outcomes

The project produced a number of meaningful outcomes that would have been unlikely to occur in the community without the support of this grant. These outcomes are discussed below.

Promotion of the need for e-book annotation standards

On its most basic level, the grant provided an opportunity to raise the profile of the issue of e-book annotation of digital texts within the industry. While there has been some significant work on the annotation of digital texts, particularly by the Open Annotation Collaboration (OAC), an initiative funded by The Andrew W. Mellon Foundation, and the Annotation Ontology project, an initiative of the World Wide Web Consortium, neither of these initiatives has succeeded in building deep awareness among the publishing or systems supplier communities. Promotion of the importance of these initiatives, driven in part by the award of this grant to NISO, and the subsequent launch of the NISO annotation standard project has increased the profile of this problem among the publishing community in particular. Specifically, three large academic publishers now see this as a critical project to advance in the community and have put forward working group members to contribute to the standard working group. Others are aware of the ongoing work and will likely support its adoption once available.

Increased awareness of the state-of-the-art in e-book annotation

Much of the implementation work being undertaken related to e-book annotation (beyond Amazon's Kindle service) has been undertaken by small start-up companies distributed around the globe. Gathering together expert stakeholders to discuss the state-of-the-art technologically was another important outcome of this grant. Participants from nine countries were able to participate in these meetings: Canada, France, Germany, Japan, Netherlands, Spain, Sweden, UK, and the US. To the extent that many of these developers engage with each other, it is not usually in the context of full-day meetings discussing shared technological similarities and standards. Sharing implementation challenges and opportunities for collaboration among these providers in an open forum discussing interoperability was another significant outcome of these activities.

Launch of a national standards initiative to develop an annotation structure

Possibly the most significant outcome of this initiative was the launch of a new standards working group within NISO to formulate the syntax for locating an annotation reference point and a structure for sharing annotations between diverse reading systems. This initiative was approved by the NISO membership in October 2011 and a press release announcing the project was issued. This working group will develop the syntax and sharing
system, which will be published as an ANSI/NISO de jure standard. The working group will begin its work in January 2012 and is expected to issue a draft specification for trial use in late 2012 or early 2013.

Improved coordination between NISO and the IDPF

The International Digital Publishing Forum (IDPF) had intended to incorporate an annotation system into EPUB 3.0, the specification for e-book packaging and distribution released in October 2011. Annotations were discussed as part of the revision of the EPUB standard but were deferred in January 2011 due to profound disagreements in the IDPF working group. NISO and IDPF are now coordinating their work on the development of standards for annotation systems. This partnership will ensure that the specification that NISO develops will be incorporated into the next release of the EPUB specification. Both organizations can leverage their respective technological strengths and foster greater awareness of the specification in different segments of the information distribution community.

Technological consensus on the need for a heuristic approach to annotation location

One of the most significant technological advances that was a result of the two meetings, but in particular during the meeting in San Francisco, was consensus about the difficulty in locating the annotation point within a reflowable or changeable text. There are a variety of ways to locate a point in a digital text, such as: XPath, absolute character count, “chapter and verse” location, or hash string location of surrounding text. Each of these strategies is not sufficient to locate a unique position in a digital text across manifestations of a work. For example, with absolute character count, the addition or deletion of text from edition to edition would break the string location between versions. This is particularly problematic since even minor changes to a text can impact this location strategy. An author or publisher may sometimes make text changes even when these editions are not specifically identified as new editions. This practice has been frequent, if unacknowledged, in the print world but is much more easily undertaken in a digital environment. If digital texts are expected to be less “fixed” in the future, with more frequent changes to the complete text, the use of absolute character position within a file would be unreliable. This equally applies if one were to use absolute position within any subset of the work’s text, such as with chapter/paragraph location counting. Another example of a challenging strategy for text location would be the use of hash calculations of the preceding and following characters of the annotated text’s location. While this might work in many cases, there are challenges when text is repeated within a work, which is not as infrequent an occurrence as one might think. Song lyrics, poetry, and children’s books (think of Dr. Seuss) often repeat text many times throughout the work. If there are multiple instances where the text hash would be the same, then the location structure would be unreliable.

Following the discussion of the strengths and weaknesses of the different approaches, the group came to the conclusion that one approach alone will not work sufficiently. It would be best for the standard to rely not on a single approach but to develop a heuristic approach of several of the approaches. By blending approaches, a strategy for uniquely identifying a
particular point in the text would likely be possible. Several of the technologists participating in the meeting began work on developing that heuristic approach subsequent to the meeting. There is likely a need for some further technological development and investment in a reference implementation of one or more of these approaches to test their applicability on robust content.

Conclusion

The project was successful in its stated aims of bringing together technical experts related to e-book annotation systems and advancing this topic within the community. The two meetings organized by this project helped to coalesce industry interest in this topic and broaden the number and types of participation in the community. The award of this grant and the two meetings arranged by NISO were critical components in the movement to develop a standard for the location and sharing of reference and annotation information, which is currently being developed.

On behalf of the community, NISO would like to thank The Andrew W. Mellon Foundation for its support of this work and for community organization efforts related to annotation sharing. Because this is a forward-looking project, without the support and funding from the Foundation, an annotation standards project would have been unlikely to get the support of NISO’s members. Several organizations perceived prior to the meetings that such standardization was a lower priority at this stage of e-book development. The current NISO standards development activity and the perception of the importance of e-book annotation are largely due to the support of this grant. We hope that the Foundation shares this view of our work.

It is anticipated that a draft systems specification will be available in late 2012 or early 2013 as a direct result of these meetings and this grant. It is conceivable that an additional modest grant might be useful to support the programming necessary for the development of open-source reference implementation of an annotation system built on the specification developed through this standards initiative. If this is determined to be the case by the working group involved in the development of this specification and standard, NISO might reach out again to the Foundation for additional support.
Appendix A – Meeting attendee list

Frankfurt, October 10, 2011

Todd Carpenter, NISO (tcarpenter@niso.org)
Nettie Lagace, NISO (nlagace@niso.org)
Aquiles Alencar-Brayner, Curator, Latin American Collections and Digital Scholarship, British Library (aquiles.alencar-brayner@bl.uk)
Graham Bell, Chief Data Architect, EDItEUR (graham@editeur.org)
Henrik Berggren, CEO, Readmill (henrik@readmill.com)
Mark Bide, Executive Director, EDItEUR (mark@editeur.org)
Jeff Deneen, Director Sales and Marketing, MetaPress (jeffdeneen@metapress.com)
Jean-Marie Geffroy, President & Founder, Mantano (jmg@mantano.com)
Markus Gylling, Chief Technical Officer, IDPF (markus.gylling@gmail.com)
Marc Köhlbrugge, OpenMargin (marc@openmargin.com)
Kang Lu, Developer, Aldiko (kang.lu@aldiko.com)
Bill McCoy, Executive Director, International Digital Publishing Forum (IDPF) (bmccoy@idpf.org)
Caren Milloy, Head of Projects, JISC Collections (c.milloy@jisc-collections.ac.uk)
Lindsey Nix, Product Owner, MetaPress (lindseybatte@metapress.com)
Eefke Smit, Director of Standards and Technology, International Association of STM Publishers (eefke.smit@xs4all.nl)
Heather Ruland Staines, Senior Manager eOperations, Springer Science + Business Media (heather.staines@springer.com)
Anna Vernon, E-books for Further Education Project Manager, JISC Collections (a.vernon@jisc-collections.ac.uk)
Jenny Walker, Consultant, Ex Libris (jenny.walker@exlibrisgroup.com)
Tiffany Wong, Co-founder, Aldiko (tiffany.wong@aldiko.com)
San Francisco, October 26, 2011

Todd Carpenter, NISO (tcarpenter@niso.org)
Nettie Lagace, NISO (nlagace@niso.org)
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Travis Alber, ReadSocial/BookGlutton (travis@bookglutton.com)
Henrik Berggren, Readmill (henrik@readmill.com)
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Bill McCoy, IDPF (bmccoy@idpf.org)
Bob McQuillan, Innovative Interfaces (bmcquillan@iii.com)
Corey Menscher, Findings (corey@findings.com)
Aaron Miller, ReadSocial/BookGlutton (aaron@readsocialapi.com)
Rob Sanderson, Los Alamos National Laboratory (azaroth42@gmail.com)
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Mark Stackpole, California Maritime Academy (mstackpole@csum.edu)
Dan Whaley, Hypothes.is (dwhaley@hypothes.is)
Adam Witwer, O’Reilly Media (adam@oreilly.com)
Ricky Wong, Mobnote (rickywong@gmail.com)
Appendix C – Link to presentation slides

There is a webpage for this project on the NISO website. That page contains background information on this project, identifies the participants, and provides links to the slides presented during the meeting. The URL of that page is: www.niso.org/topics/ccm/e-book_annotation/

Below are direct links to the presentations given during the programs.

Frankfurt Meeting

Introduction & Discussion Topics Presentation (Todd Carpenter)

Reading is a Social Activity Keynote (Todd Carpenter)

Open Annotation Collaboration Background (Robert Sanderson via Todd Carpenter)

EPUB Activities on Annotation (Markus Gylling)

San Francisco Meeting

E-book Bookmarks and Annotation Standards Planning Meeting (Todd Carpenter)

Developing a Standard for E-book Bookmarks and Annotation Sharing (Todd Carpenter)

EPUB 3 Annotations/Linking Port-Mortem (Bill McCoy)

Open Annotation: Social Bookmarking and Annotation of eBooks (Robert Sanderson)
www.slideshare.net/azaroth42/niso-annotation-meeting-san-francisco
Appendix D – Frankfurt meeting minutes

E-Book Annotation Sharing and Social Reading
A Pre-Standards Workshop
Frankfurt, October 10, 2011

Background, Introduction – Todd Carpenter

Reading is a social activity; sharing what you read with other people is an important part of the reading environment that needs to be preserved in the digital environment. We can use digital tools to help facilitate that. All of our reading devices are connected; we use a variety of reading devices, but we are not encased in the devices. We use different ones and need standard ways to share information.

What is the difference between annotations and bookmarks? Bookmarks are a required element of annotation, but not all bookmarks are annotations. Annotations are more complex than bookmarks.

People want certain functionality, but they don’t care how it works—only that it works. It’s desirable to integrate technology in such a way that people don’t need to think about what’s happening under the surface. Like plumbing, you just want to turn on the tap and flush the toilet.

What are other applications for annotations? There are a variety of things we might like to annotate. Should we incorporate non-textual things, such as photos, videos, and text-to-speech?

We may not develop a standard on how to share; we might develop a protocol to move an annotation from one system to another. We need to determine what are the required elements; what are the best practices. We want to focus on the core elements of an annotation environment that we can standardize at this point in digital distribution.

In the process of developing a standard or best practice, we want to be as agile as possible. We don’t want to slow down processes or inhibit market innovation. We should determine what are the core critical elements that need to exist to create a sharing environment, such as a syntax for locating the reference that needs to be applied across a variety of platforms. A syntax and core elements for sharing could be the primary outcome of this work. The technology for sharing could be developed iteratively over time; we shouldn’t get wrapped up in a particular transfer protocol. Example: this is how you locate the annotation and this is how you describe the annotation—then let developers determine how to incorporate it.

Standards could be thought of as an innovation-free zone. We standardize things that are do-able, but it’s mainly to get the benefits of interoperability. If something hasn’t been invented yet, it’s wrong to standardize it—that’s the time of innovation.

Recommendation: Set artificial deadlines to prevent taking an infinite amount of time in development, especially with a consensus standards organization. Otherwise, iterative work will take a very long time.
We need to discuss scope of the project. From a user perspective, it’s useful to think about incorporating other media. Users will want to have annotations in different platforms and use them however they like. It’s my opinion that the scope of work should be broadened from text.

Video annotations would be interesting, but should the standard be developed for all these media at the same time in parallel or should one be worked on and then move to the next after good practices are developed? OpenMargin is also interested in image annotation, but it might take a long time to develop this if it’s added in to the scope.

A move to multimedia annotations would change the stakeholders as new audiences emerge. If you bring in video, you have to talk to the movie industry. This gets complicated, even if a wider scope is seen as critical. The broader the community, the slower the process.

At what point and how should other people who are working on parallel projects be engaged? It’s still possible to monitor what happens in other environments as this group progresses with text. There is a WC3 Media Annotation Working Group, working on APIs for annotation of media—at least as of September 2011, something was active.

Open Annotation Collaboration – Rob Sanderson (delivered by Todd Carpenter)

The focus needs to be on the interoperable sharing of annotations. A potential use case might be if I want to keep my annotations if I move off the Kindle platform years from now. So we want to create an environment where notes can be moved.

The basic model has three resources:

- annotation (an RDF document)
- body (comment of annotation)
- target (what you are referring to)

Most annotations are not about the entire book but rather about part of a resource. Different segments exist for different media types.

A Web architecture segmentation, for example, could have a URI with a fragment that identifies part of the resource:

- IETF mime-type fragment identifier, e.g., xpointer
- WC3 Media Fragments URI specification

OAC introduces a method of constraining resources by introducing an approach for arbitrarily complex segments that can be applied to the Body or Target resource.

With more complex constraints, fragments are often not possible. Instead, we need to introduce a constraint that describes the segment of interest and a ConstrainedTarget that identifies the segment of interest. Constraints are resources, so they can be expressive and detailed. (See slide 9, “Constraint Example.”)

Unlike previous systems, Open Annotation does not mandate a protocol. Instead a publish/subscribe method is promoted that has several advantages. The client can use the most appropriate method, annotations are web resources in their own right, and it promotes a marketplace of services.
The open questions that OAC has identified include:

- How to have a robust mechanism for determining the segment of interest
- How to handle different manifestations of a work – How do you identify a particular paragraph in the original edition versus the republished 20th century edition and the new e-book version? This is a very tricky problem.
- How to motivate public, rather than private, annotations

We want to take OAC’s research and bring it out to a larger community; try to formalize the work they’ve done, build consensus, and put it out for public comment and testing.

**EPUB Activities on Annotation – Markus Gylling**

EPUB is based on web/internet standards; we believe in collaboration with other organizations. EPUB3, therefore, is based on HTML5; everything in HTML 5 is legal for an EPUB 3 publication. IDPF is currently working on making EPUB an international ISO standard.

With respect to annotations/bookmarks, IDPF is happy to have another organization take leadership on the topic. Annotations were discussed during EPUB 3 development but were deferred in January 2011 timeframe due to profound disagreements in the working group. (See Keith Fahlgrens’ write-up at [blog.threepress.org](http://blog.threepress.org); see also [code.google.com/p/epub-revision/w/list?can=2&q=annotation](http://code.google.com/p/epub-revision/w/list?can=2&q=annotation).) IDPF was contacted by OAC but wanted to see where OAC went with their model.

As we integrate a lot of audio/video, we had the ambition of covering targets as well as the annotation. We were looking at the annotation itself as a publication, because annotations can be EPUBs themselves. There is a range of different media types you can use to represent the annotation.

Body and envelopes are addressed by:

- Manis
- Astri
- Adobe
- openannotation.org data model

From a concrete application perspective, the user activates a link to the target reading without knowing the location of the target. The activation first looks at the user’s private bookshelf to see if the target is there. If not, then an online resolution is done with options to purchase or borrow. The physical location of the target is unknown, unlike on the web where everything is based on the physical location being known.

You could have a hierarchy of specification: any version from a particular publisher until you get to the most abstract. The core problem lies in the linking. There are two types of inter-publication linking:

- Loose links – fuzzy, degradable, and robust links to any instance
- strong links – explicit, fragile, verifiable to an exact document
With media-type fragment resolution, if you don’t know the location, it could be a fuzzy or a strong link. Three different approaches have been proposed:

1. Custom scheme (this notion died pretty quickly)
   e.g., epub://safdsafdsaf/dfadfdaf
   scheme://document id/target identifier
   This is not a loose link. If you can’t locate it on the user’s bookshelf, it won’t work. You have to rely on the target having an ID. It’s brittle, and there’s a lot of controversy over identification of a new scheme. (It’s considered to be bad form on the web to create new schemes unnecessarily.)

2. Persistent identifiers
   a) PEI (PURL-based EPUB Identifier)
      You would have a resolver service, e.g., purl.idpf.org:
      file=&fragment_id&text=
      If you can’t find the resource via the identifier, then take the string and search. If you don’t find it on the user’s bookshelf then hit the web: submit it as a string to an online query service.
   b) DOI (Digital Object Identifier) and PEI
      DOIs can integrate seamlessly into the PEI.
      DOIs cover a wide array of publishers. Big publishers register DOIs and subdomains for PURL, but if you’re small, it gets overwhelming and you may not bother. This method could work but it will exclude parts of the publishing community.

3. Link resolver services
   This didn’t go anywhere.
   URI Centrism: Maybe there is a mistake here of trying to pack all of it into a URI string. This could work but we might be able to create something stronger, richer, and more extensible if we drop the URL paradigm and just express an intent. You would be able to store bookmarks in the cloud.
   EPUB3 established a linking registry: collect linking schemes that are evolving; supports temporal and spatial offsets; allows the expression of simple ranges. It is not hand-coding friendly.
   Linking Registry and CFI: http://idpf.org/epub/linking/

**Q & A for Mr. Gylling**

**Q.** Re loose linking: If text changes and if the annotation is placed to a new edition, it might not mean the same thing as when placed in the older edition.

**A.** Yes, the solution needs to have fallback levels which have a clear priority so the client can know: as far as I know everything worked perfectly. Then if it goes down one
level in the priority, inform the user something is wrong here. It’s true that everything can change. As the creator of an annotation you might not want your annotation to be accessible in a newer edition.

Q. Can you point to different editions, say, an open access version? If I can’t get to something in a walled garden, find the “next best” version, perhaps in open access area or something alternative?

A. Yes, that’s the right idea.

Readmill.com – Henrik Berggren

Readers’ books can be full of annotations and this should also be possible in an online environment. From anywhere to everywhere, readers should have the opportunity to be social. For example, you should be able to highlight passages without interrupting what you are doing, see your highlights, and share them on Facebook, Twitter, or Tumblr.

Books have “home pages” on your readmill account; a progress bar appears when you sit down to read. You can also share the location of where you were when you read the book. Reading and annotation is done from within the book; readers don’t want to go to a browser to log their annotations—and with readmill, they don’t have to. Your annotation data is working on top of your book.

You can follow other people on the site. A marginalia mode will be released soon—when you flip the iPad into landscape mode, you can discover other people’s highlights and comments inside the book.

OpenMargin – Marc Köhlbrugge

OpenMargin is a meeting place for like minds. We open up the margin of a book and make it a meeting space, so you can see other people’s annotations. It’s more focused than readmill on just the annotation part. We want to enable sharing of perspectives on specific parts of text.

The service is still in private beta; we hope to launch in a few months. We didn’t want to build our own e-reader; we want an open API for Kindle, iBooks, etc., where systems can connect. But when we contacted e-reader developers, they didn’t reply.

We wanted to know what it would be like to support an API, so we built our own app. We want to see how people will iterate on our app. We are interested in partnering with other e-readers. We want to have the community build an android app.

We use offsets for bookmarking and currently only support EPUB books. The system breaks for different editions of books. We use XPath, which is one way to target a specific tag in an HTML document. We don’t support image or audio annotations.

We are not sure if every reader wants to have this functionality or share everything they read. If you want to annotate in private, then don’t use OpenMargin—everything here is public. The user contributes under a Creative Commons License, so the information can be
taken and edited for future versions. OpenMargin hasn’t decided which CC license to use yet as you don’t want your annotations to be changed and published somewhere else.

Visit openmargin.com. You can leave your e-mail address and you will receive an invitation when there are places available.

**Q & A for Mr. Berggren and Mr. Köhlbrugge**

**Q.** Are there copyright laws surrounding the publication of excerpts? This was a concern at the New York meeting in May: that we be sure we protect publishers’ interests.

**A.** Readmill lawyers have written a disclaimer, and if anyone wants content taken down we will do that. Readmill is a terrible way to copy a book, but a very good way to market a book. As long as you actually write an annotation—a comment to what you’ve highlighted in the text—it becomes in most countries legitimate to do that, as you aren’t just copying, but you’re creating a new work. The issue is when you highlight and don’t comment.

**A.** OpenMargin can limit the excerpt. At most you can highlight the whole page; if you do more than that it’s not a real annotation. There is a grey area in what is the proportion of the annotation versus the whole text. We ask users to annotate in a way that’s allowed within their country.

Anyone who sees the annotations already has a copy of the book; in online mode, you use the local copy of the book. You could also limit access in an API call, support access of X number of pages of the book, or X number of annotations. The idea would be that recreation of the book can’t be done easily. This would go a long way to alleviating concerns of publishers. As publishers are now publishing/selling chapters of books, this may be more of an issue (as content “chunks” are smaller).

OpenMargin is now based on EPUB and in EPUB 3, fragment identifiers have to get packed into a URL; it’s not a JSON structure. It’s not strictly an XPath model. A canonical is desired as you don’t want two things to point to the same text. You also have sortability, i.e., if you have a set of items you can sort them. Adobe has a schema for representing annotations; this was the seed of the proposal for what became Canonical Fragment Identifier in EPUB 3.

**Q.** In OpenMargin, if the text changes will your links break?

**A.** Yes, we use “socialDRM.” You put your name somewhere in the file, and it’s public that you have the book. For every book, for every edition; it’s a different edition even though the text is the same.

**A.** Readmill does character counting, a different approach than OpenMargin. You can see others’ annotations and if you want to see them in context you can try to locate them. (Although this may not work 100% of the time.) Readmill also allows privacy; certain highlights can be private.

**A.** OpenMargin has a different attitude; we feel it’s not something you want to worry about as a user. So many of the privacy settings on Facebook can be challenging to manage. OpenMargin is very clear that everything is public. Implementing privacy is not technically challenging, but it impacts the user experience.
As a community, privacy concerns may be something we discuss in the working group, but it would be a decision taken by the community to be open or not, not necessarily built into the system. Rather, such settings should be an overlay.

OpenMargin is not sure whether privacy settings should be part of the standard. OpenMargin would display annotations to everyone, but a user of the system would choose when to show or not. You could add a “property=private,” but it would be interpreted (or not) by the system.

How would ‘my private’ setting be interpreted across systems? Isn’t interoperability desired? It could be private within a group (example: classes or study groups). It’s probably not possible to define all the different levels of social interconnectedness in order to allow sharing of whatever context you are in.

Q. Within any one reading system there will be a range of books available. While you both talk about annotating books, the book you annotate on the Kindle is not the same one as on the Kobo reader, and your hash to indicate the citation will fail. We need a mechanism to link the Kindle version of this thing with the Kobo version with the iPad version. The same problem exists linking the 1st edition and the 2nd edition, and the illustrated version with the non-illustrated version.

A. It would be good to discuss in this group how we want the fallbacks to work, how fragile or how robust the links should be. If the technologists know that, then maybe they can design linking schemes to work. Closed systems are great but if we want to standardize, it should be more robust. But how robust do we need to make it?

A. Not sure that users of one system, say a Kindle, want to look at their citations in another system yet. They only use Kindle, no reason to use anything else in their mind.

**Codex Sinaiticus at British Library – Aquiles Alencar-Brayner**

codexsinaiticus.org

Codex Sinaiticus is a platform for books. On the left side of screen, there’s an image of the codex. On the right side, the transcription in Greek, and there are also other translations available. This helps scholars to talk about it and scholars can contribute.

The project extracts books in electronic format in different platforms and allows commenting; you don’t need to go to the file of the book. Many files are delivered in PDF format. If you have a specific area where you can share and compare different editions, scholars would find this useful.

We don’t have legal deposit for electronic publications yet, and we can’t make one single object available to different users at the same time, as we have to respect DRM. This can be a bit of a problem at times. We could get content via Europeana or Internet Archive—get whatever is there, which is copyright-free. We can put objects up and compare them. Most scholars do work on translations; if you are doing a translation, you can see the older ones and compare, make sociolinguistic studies. This is not only a social network, but also a knowledgebase where you can discuss and learn from others.

With EEBO (Early English Books Online) and ECCO (Eighteenth Century Collections Online) on the same platform (digitization of TIFF file), users can download the book with the
annotations they’ve made as well as the lecturer’s annotations and other students’ annotations. This is done through establishing levels of authority.

You can get access to this through British Library, ProQuest and Cengage. We need to make sure users are aware that any annotations will be open; not everyone (institutions and lecturers) is keen about that. The publisher is cautious about what annotations are added to text as well.

At the British Library, users of Primo (for the discovery layer) can log in, tag items in the collection, and share them. It’s important for libraries to have open access to collections and to support users giving meanings to things in their collections.

We might need to think about another linking system in the context of the Virtual Learning Environment which pulls objects down.

**General Discussion**

Issues and concerns:

- State-of-the-art: who is leading the way, what are overlaps between what we are trying to do and others?
- Possible use cases – What are applications of what we are trying to accomplish? We need to be sure this will have impact.
- What are critical components of this environment?
  - Architecture
  - Syntax
  - Portability / elements
  - Other elements we are missing?

Difficulties and challenges:

- Authentication, user / group authentication
- Cascading – Annotations on annotations; if I delete mine, does that delete yours?
- Cross-object referencing – How do you reference multiple objects, or different manifestations of the same object?
- Encryption – DRM wrapping
- Cross-media application – How is multimedia different from text; how is it the same?
- Intellectual property – Copyright? Are there IP-related issues to annotation sharing that people have already patented and will we run into any issues?
- International issues

Key players – Who is not engaged, and realistically, who might be? If we can get 85% of the community around the table, others might join.
Other comments:

- Trust – Academics must be able to trust the system that holds their annotations.
- Need someone who has a business model or financial interest in keeping it going.

**Spotify** is a model of showing an industry that opening up something can sell more of it.

Publishers are struggling to do this in their own platforms, but they would like to use it as a plug-in—it helps to promote a product.

Regarding business bets, you can’t pick winners or losers. But if you can extract your information from a deprecated system, that could be one hopeful goal of what we are trying to achieve.

Use cases:

- Classroom environment
- Authors requesting to annotate their own work—like a “director’s cut”
- People asking programming questions, occurs especially with O’Reilly books
- Collecting quotes in blogs (Twitter investor Fred Wilson, per Henrik Berggren) – You can see readings that are popular, that have gotten a lot of “likes.” You can highlight something that is hidden that can be shown to another reader later—what they might not have noticed. Social designs are probably outside the standard itself.
- Previewing a book before publication
- Academics ask students to use annotations to examine text into modern prose – This could make it relevant for students today or the instructor could go to historical texts and explain what a particular line of text means for a discussion.
- Translations – The word will be slightly different, like interpretations of Hegel.

The aim of the standard is to make annotations interoperable. The standard doesn’t need to solve identity issues, but it needs to incorporate enough so there’s some support. Are there any potential issues around libel? For example, authors don’t always write under their real names but you could trace it back.

Also be aware you may be personalizing a resource. You should have a prompt that this is not linked to a library; you’re giving information to the publisher. Like linking your Facebook account to Web of Science? Could the publisher use the annotations to promote their work? The marketing department could promote future articles or maintain paid annotators, like paid bloggers. Someone might be willing to buy annotations by a Harvard student versus an Ohio State student. There could be a lot of grey areas that might not be connected to a standard but should be anticipated.

We see annotation as a kind of dialogue. Attitudes toward sharing are changing these days. You might annotate for yourself and don’t want to contribute under certain circumstances, but most of the time the basis for annotation is dialogue.

**What are critical components to making this system work?**

The **identity** of what you are commenting on is a critical issue. For cross document links, you rely on the people who are creating the original product. If a particular e-book format doesn’t have a strong identity built into it, then it’s hard to comment on it.
If you have an e-book that doesn’t have rules about identification, your system may use an identifier that may be unique. You can link to something, but the something is unknown.

The other side is the **granularity**. There may be some annotations for which you want to be able to say: I am annotating this specific paragraph in this specific version of this work. The same annotator may want to create something that belongs to all versions of the work.

It’s difficult to do both. That’s a serious problem for the wider/working group to determine. It’s difficult just in the EPUB world; if you want to go across many e-publication formats, it’s even harder.

If we presume we can do one or the other, which is more valuable: this one manifestation or all manifestations of this work? I think you can do both as long as you make it explicit. It depends on what you need to do; do they need to be mutually exclusive? Could they be opt-in/opt-out? Manifestations are a fundamental issue; how they are identified is important.

However, manifestations are easier than the ‘work’ problem. ISBN is an identifier, but we don’t have good identity models for work. ISTC has a particular view, which doesn’t necessarily concur with frameworks like FRBR and is not particularly well-used yet. Could ISTC work well in this particular use case? It identifies a particular text of a work; the same ISTC should generate the same hash when you are comparing two texts (more or less). ISTC’s can also have relationships—can have parents and children—and you could group ISTC’s that themselves have relationships. xISBN does this for the library community.

ISTC can be expensive to implement and there is a risk of excluding some users who simply can’t afford it. It would be nice if our mechanism had a fallback strategy. Don’t pick a singular solution for identifier problem; maybe the choice can be created dynamically without any cost. (But if that’s the case, then why would anyone use anything else? There must be some drawback to the free one; perhaps it is weaker, good results are less guaranteed.)

Readmill uses this type of fallback/escape hatch. (Like foursquare—in foursquare when you check-in, it shows you what is nearby and asks if it has the right place. If it’s not, you can choose another place.) Could say, “Is this the book?” Yes/No. If it’s not, allow the user to search for it.

You can also design an annotation system that doesn’t necessarily speak to others: here’s the location of the reference, here’s the item. Part of this conversation assumes there is value in sharing but it’s not a given.

Could this project be useful if all we did was create a syntax? Creation of a syntax is much easier. Lots of syntaxes “work” and there are lots in existence. The difficult part of this problem is making annotations work outside of any one ecosystem—which goes back to the manifestation issue.

So if the system is open and commonly used, then we would we still need to have the interchange and the packaging? If everyone is using ONIX, then how you exchange an ONIX file doesn’t really make a lot of difference. There’s some difficulty in setting up enough standardization to allow export and import. When we talk about portability, we’re not talking about a grand scheme, but enough to allow some level of current interoperability, and ideally support the ability to integrate with future systems as well. Examples are film and music, which are black boxes to us today—not represented. If the syntax is too restrictive, then they might become more of a challenge.
What should be the other bases for the standard? It should be web architecture. There are other standards for similar things that we should look at. James Bridle has created open bookmarks, where you export your subscribed feed from an RSS reader; this has a lot of commonality with annotations. That could be one basis.

**Authentication and issues around it**

References noting each other (cascading) and permanence or non-permanence of references are issues. This becomes a more complex social design and there are probably a few paths. Mr. Berggren likes the idea of a “deleted comment” placeholder; if the anchor disappears then comments do too, as used in flickr. If you delete something in the middle, like delete a significant comment, the “deleted comment” placeholder is used. If someone deletes their account, the comment is deleted and the message is “deleted user/deleted comment.”

However, where it’s shared, if it’s killed in one system can the “delete” message be propagated to kill it in other systems? That’s very anti-web. Photos that are deleted in iPhoto aren’t deleted in Facebook or flickr. You’re not supposed to propagate data unless the user explicitly wants you to do that, even though they might not know where the data went when they said it was OK to share.

There is no utopia where every piece of data is linked to its origin; that’s a much bigger problem. Should we consider this issue when a system is interchanging data, if a user has agreed to share?

It goes back to a user’s identity, where s/he can manage everything. Facebook would pick up on this; that’s exactly what they are trying to do—they want to own the graph. We’re talking about the opposite thing. How big an issue is this “cascade”?

We want to use something that’s simple and solid. Should this work also ensure archival preservation and versioning or determine behavior when the item is deleted—or is this left to the discretion of the development companies that provide this functionality? The working group will need to determine whether this is in scope or not. Comment: standards should be an enabler. Privacy is more a restriction discussion than an enabler. People who do it wrong will not get any traction in the marketplace.

What about encryption/DRM? You can’t separate this from authentication. There should be a way for a reader to find they have access, if it’s in a library service. As a next step with the annotations, the student will want to see what they have access to. Libraries wouldn’t accept publishers doing this in their own unique ways. If you lead someone to content, it is not a problem if it breaks down—if there are breadcrumbs.

Already there are many links in the chain now with discovery services. The concern is that adding another link with bookmarking will make access too fragile to depend on for users.

Is the cost of getting around DRM prohibitive? If you have a key, you should be able to get through the door; limiting the keys is OK. It sounds like in this case, there’s a limiting of the keys. Keys are expensive and you have to learn how to use them. DRM-protected EPUB files are the same as unprotected EPUB files once they have been unencrypted. This is obvious but is it for the annotation standard?

Are licenses needed for excerpting? DRM is only the tool that enables the protection and is highly configurable. There would be an agreement between the publisher and the person who has the master file. Some companies have rights to publish lots of excerpts. We aren’t
Talking about DRMing annotations that people make on any particular platform; that would be weird.

International issues – A lot of annotation is covered by fair use in the US, which is not covered outside. There are also privacy issues in the EU which are not applicable in the US. There may be territorial rights for manifestations. For example, the manifestation from a publisher in the US and a different manifestation from elsewhere. You may want to point to a different version from the one where you are; what is your “appropriate copy”? Is there copyright/ownership of the annotation itself? Different institutions will have different rules; some have particular attitudes regarding content created by academics and students. Annotation services may receive takedown notices and will need to comply. Moderators will need to ensure that people who are adding annotations are legitimate users and that they’re adding something meaningful.
Appendix E – San Francisco meeting minutes

E-Book Annotation Sharing and Social Reading
A Pre-Standards Workshop

Held by the National Information Standards Organization (NISO)
October 26, 2011 in San Francisco

Introductory Presentation – Todd Carpenter (same as at Frankfurt meeting)

We want to promote the book as part of a larger community. How can we extract the knowledge into a communication platform? The challenge is not the technology; the challenge is the user experience.

Discussion following the presentation

Related efforts and other participants:

Q. Have you reached out to flickr for participation in this?

A. NISO has a broad range of members, like RIAA (Recording Industry Association of America), etc. Should we also invite them to participate? How high on their priority list will this project be? We should build a system that at least could accommodate these kinds of things.

Note: ANVIL—a free video annotation tool (www.anvil-software.de). How important is “this” outside text?

Regarding Anvil, above: It would be good to have a way to address time codes, even if only adding a few more fields.

One challenge is that we have lots of switches. There are also competing standards and work being done by W3C in this space. We’ll need to engage them and partner with them to do it.

Reading as a social activity

Q. You say reading is social, but we got feedback on our product via blog posts and articles that, conceptually, reading is a solitary activity and people weren’t able to see how this could be interesting or engaging. Do you have any thoughts?

A. We can distinguish between the act of reading and the social experience of reading. We want to focus on the experience related to reading; that is, about sharing. We don’t want to conflate the two. Reading has always been social; people read and talk about what they are reading. Technology allows us to lower the bar for that kind of engagement; it may be difficult for some people to imagine some social aspects, because they aren’t connected with it yet. We are just spreading it out more. If you
look at how people talk about books, there is a desire to connect around ideas. If you

can create a medium for this, people will go for it.

We should enable selfish behaviors as well, by supporting annotations for personal

use. That way, the social thing is great but becomes another thing on top of what we

need to build.

You can share with a group of one person where the person is yourself, but on
different platforms. People don’t want to see everything everyone has ever said about
a book; for example, I want to know what my circle of friends or people I respect
have said. We’re not talking about a web-scale system where everyone sees
everything. There are a number of reasons to not make this service global.

**Scope and focus:**

**Comment:** In this work, we don’t want to boil the ocean—don’t want to create another
HTML5 that might be done in 10 or 20 years. In regard to inviting other people to the

table, we do want to do that, but at the same time we’ll need to streamline and focus on

the most important problems we want to solve.

**Q.** Is it inconceivable that we could keep the scope limited to just books? OAC (Open
Annotation Collaboration) is a great candidate for exposing or consuming annotations

that exist, but what about the OAIS (Open Archival Information System) model to help
determine what kinds of interactions different roles have. Maybe we can determine

which standards are complementary.

**A.** What we may end up with is a suite of different specifications that have to interrelate

and plug into FOAF (Friend of a Friend), e.g., what are you referencing, where is it

referred, who is/are the person/people referencing.

**Q.** Why are roles necessary for the standard? This feels out of scope and should be handled

at the service level. As a group we need to come up with the scope. What are the

boundaries of what we are trying to achieve? There is already other work that has been
done on reference location—examples: IDPF, Adobe. How could that fit in? Would Adobe
be interested in openly releasing what they have done?

If we include roles, aren’t we limiting the use cases, which are basically too much to be

imagined at this point? Are we coming too far in the discussion?

**A.** Regarding OAC dividing the data model, which is easily shareable, and the network
protocols to do the sharing—this is how OAC has approached it. OAC doesn’t say

anything about how the client and server communicate; just says that they should
communicate. Can’t go to Google and say, “Do this.” Roles and groups and users,
authorization, and authentication are all on the network side. OAC discussed how to

describe the annotation itself rather than who should see the annotation.

**A.** NISO develops standards and recommended practices. There can be multiple

recommended practices to cover different approaches. This project could include a

formal specification for reference location.

**Comment:** Older books are often just images; so in order to annotate you may need to

handle images anyway. OAC worked on medieval manuscripts and can demonstrate

this.
Follow-up: An issue discussed at the Frankfurt meeting has to do with where different editions of a work exist but you want to reference the same point in the edition you possess. Yes, that’s a very important point!

Comment: It would also be desirable to know whether the annotator is expert or an amateur.

Q. If videos and images are independent, we could pursue them—not in an integrated way, but possibly in a parallel way. Another question about the process is: Are we doing this top down with a focused niche and growing that? We should get the data format solid and adopted, then build on top. For a standard to live, adoption is critical; making it small helps it get adopted.

Comment: It’s important to heighten the importance of identifying location in text before we identify anything else. A lot of people are already doing this. We need to have implementations of this specification before it’s completely final. A good point of reference is HTML5, where people are building systems as they agree that certain sections are normative. This goes back to the first issue: if we can agree on location of text, we have a point to go on and implement and move forward, and then talk through the other stuff.

Copyright and business model questions:

Regarding copyrighted articles: How can you share articles or what is possible to share, without purchasing them? It’s one thing to annotate Huckleberry Finn and Hamlet or other material clearly in the public domain; it’s another thing to annotate the article that came out last week in Nature. We want to make sure this is not just for public domain works. How can we set up a system that shares the location of the bookmark and the comment?

Q. How should we consider business models? How do you sustain something like copyright, which is a revenue model, while you have the technology (is that too weird a scope)?

A. We should steer away from discussion of business models; we build the infrastructure, the plumbing, not the custom kitchen. Walled gardens are OK as long as they are interoperable enough to get the annotation engaged.

Follow-up: But how do we avoid the first generation of browser wars, with e-book readers; is there a way to do this? This was very anti-standards and led to frustration and slow take-up. There is often a business case for noncompliance, unfortunately. Not sure there’s a way to deal with that.

EPUB Canonical Fragment Identifier (epubcfi)

Comment: We could have an interesting discussion about CFID. There is a tension in CFID; if you highlight a selection and the data being used to represent that text is not something a human can look at, it’s less of a detriment than if it’s not reliable. The key word is “canonical,” but the tradeoff is it’s not easy for humans to work with it. Similarly, XML or not XML is a religious war. For some things, a fragment identifier is a good thing; for others it’s bad. Might be handy if the document changes a lot. CFI identifies a precise spot—if you’d rather have something fuzzy; for example, if there are changes in the wording etc. CFI should only be used when you know exactly what you refer to. There’s no good solution for fuzzy identification; you still need to identify the edition to which you are pointed.
Open Annotation: Social Bookmarking and Annotation of E-books – Rob Sanderson, Los Alamos National Laboratory

http://openannotation.org/
http://www.slideshare.net/azaroth42/niso-annotation-meeting-san-francisco

OAC focuses on sharing and interoperability.

- You might be sharing with yourself, but across different platforms.
- The approach is web-centric and open. Everything has a URI, an identifier. It should be possible to share anything.
- The advantage is that you can create, consume, and interact with annotations in different environments, like your e-book reader, your desktop, your laptop.

Examples in Dr. Sanderson’s slides scale from small to more complex. Feedback is welcome. The basic model is very basic—just a simple RDF diagram. The Annotation has a Body and a Comment.

- For example, an annotation could have a Body, which is a review in Amazon about a book. Each thing has a URI and relationships are indicated to express how they interact.
- Of course, most people don’t talk about how they may have liked all of a book; they’ll indicate I liked this passage or these images. Different ways of resolving these references are necessary.
- A paragraph can be referenced if it’s just plain text, or media fragments, or an arbitrary shaped area.
- Different ways can be developed for audio and video. Maybe you want to talk about part of the data; you need a way to slice a 3D object.

Web architecture has an approach for segmentation of objects using fragments: e.g., “hash blahblah” on the end of a URI. Web standards organizations like IETF have specified a fragment identifier. W3C has media fragments that specify this for a number of MIME types. There are limited specifications for image, audio, and video.

OAC introduces a method of constraining resources which can be more expressive.

- You can bundle this up and put it into a URI—there’s a constraint which describes that. It describes the section of interest as just a resource on the Web.
- The constraint "target" is a URI that identifies the section of interest. If it is dereferenceable, it will provide the part of the document that has been described by the constraint.
- The "body" constraint describes how you discover the section in the document.

WC3 Annotea, (a resounding failure) has a data model and a protocol specification. OAC has tried to go the other way by not specifying any transfer protocol; you can transport any way you want. This gives the client some autonomy. You could use a plain REST or use Dropbox; nothing in the OAC specifies how resources should be shipped around, just that they are Web resources that other people can consume using their clients.
• Advantages of this approach are that the user can use the most appropriate method, which may already be specified, and you don’t change what already works.

• Annotations become Web resources by necessity so they can be protected and allow access to existing Web authentication/authorization mechanisms. They’ll have their own URIs for identity, which is important when you want to start comment chains referring to them.

• Marketplaces for additional services may also spring up—like archiving your annotations or services to register annotations with additional metadata.

With any such system, spam detection may become an issue and trusted networks will be important. There are hooks in OAC that could be used for this, but they are just a model; someone needs to build further software to cope.

Slide 17 shows questions that Dr. Sanderson drew out from the discussion in May in New York.

• The referencing point is critical; there has been a distrust of quoting passages, but also a distrust of not quoting passages and just using offsets. But then when the text changes, the reference changes.

• There were also questions around mixing public and private annotations. There is an obvious community of use. The open question is what level of community is required and how big must the community be in order to be useful?

Q&A for Sanderson

Q. Less interested in the OAC model; more interested in the definition of the relationship of what we are talking about as two or more entities. Could this be mapped into OAC?

A. OAC doesn’t say how you must implement; it’s absolutely the case that you do not have to rewrite using RDF. OAC creators would like you to be able to map your existing model into the OAC model.

Q. OAC seems very complete, very full. Where do we begin with this thing that’s full; is there a piece of it we can extend?

A. Possibly publish/subscribe (slide 13). If everyone is building something that talks to their own server, it would be better to be able to talk to each other or move clients between servers. OAC will not standardize things in that regard. We also need to be able to point to a particular part of a document—Dr. Sanderson’s first choices for what the group should discuss today.

Q. Can OAC link to translations or other versions of documents?

A. Yes. One body is designated as the default version, and that body would be linked to translations or other version; for example, the translation in Japanese.

Q. Does OAC talk about “afterlife” of citations, something that can’t be dereferenced?

A. Not directly. There’s always a URI—an identifier—but it doesn’t have to be an HTTP URI or URL; it could be an ISBN or a UUID. Nothing says everything has to be HTTP. Metadata can be attached to say this annotation was made at this point in time about this resource as it was at this point in time; if the resource is the same as it was—might be, might not be. Another solution involves other technology, as Internet Archive also works on those kinds of problems. There are ways of recovering the
original text using the Memento system—whether that helps to address the changing text, and whether or not the reference is still valid or not. If you could recover the previous version of the text, you’d know where it was; but you’d like to see the annotation on the current version of the text. About something that can’t be dereferenced, it doesn’t matter if the target of the annotation is gone because the annotation is its own document. Whether you can display it is another matter.

Q. When publishing/subscribing, what would topics be in terms of the data that the topics describe? If I subscribe to a topic, what am I subscribing to—an annotation, a reply to annotation?

A. We don’t say anything about how the subscription should be. For example, you could join a Dropbox folder and look in it for annotations. You could divide Atom feeds by target; for example, give me all the annotations that are about resources on this Web server, or written by a certain person, or since a certain point in time.

Comment: The possibility of complex data structure seems cool in theory, but in reality data could get out of control for developing something users understand. We could wind up with a lot of infinite recursion, things referring to themselves.

A. Do you mean structures in OAC or structures in things referenced by OAC? The most complex annotation model only has seven nodes. This model seems simple; it’s just what that translates into when you aggregate together vast numbers of annotations that is more complex. In the experience of the OAC team so far, aggregations haven’t ever gotten out of control to the point where they are unmanageable. But there is a large risk if people delete annotations and those annotations are referred elsewhere. It will be important to archive annotations so you can find the original string. The OAC team is not too concerned about the complexity of the overall system, as they don’t believe everyone will want to have every single annotation about every single thing; but rather people will be interested in communities or groups or topics. Unless you are Google, you don’t want all annotations. Biting off the chunk of annotations that you want should keep things manageable.

Q. Are there identifiers for the annotations?

A. It has to have a URI. When you publish to the web or a server, the server should make an HTTP URI to say “here is the dereferenceable version of the annotation on Dan’s iPad.” The server has to allow other clients to see it; we suggest doing that via an HTTP URI. If there are patterns that emerge for how these URIs could be minted to help people find it (e.g., /topics/annotation), that’s great, but we are not in a position to specify that at the moment. Maybe this group could be a better place to do that.

Q. Is there a provision for multiple URIs that link to the same fragment or is the assumption that if you have several URIs, each URI refers to a distinct fragment and that each distinct fragment has a URI? What if a particular paragraph appears in many editions of Huckleberry Finn; can I make my comment apply to all of them?

A. You’d add annotations to the annotations to show different connections: it’s here, it’s there. You can annotate multiple parts at once. Someone else might have a different method of doing this.

In general, OAC is a framework that’s simple enough for adoption and broad enough to cover most use cases; but the devil is in the details and it’s up to the community to determine what these are and what is the most appropriate way they should be dealt with.
**Discussion re offsets:**

Quoted passages are used for text—for example, here’s the bit of the Steve Jobs book—or character offsets, i.e., start at character 150 and go to character 180. Expose all of the data. The problem with character offsets is that you can’t tell if they are still correct. Remember all of these elements have URIs so they can be dereferenced separately. You can put your authorization layer in between the annotation and the constraint. You know it’s about *Alice in Wonderland* but you have no idea where unless you have permissions to dereference. You can create a digest and do the offsets. But you can’t reattach it. You know that it’s not there, because the digest is different but you don’t know where it has gone.

So you annotate an O’Reilly book that’s in beta, you comment on it; for example, you say a section should be updated, and then they do it. Great. But now your comment can’t show up, when the text isn’t stable. If you have the full text and the exposed offsets, the client isn’t going to know how to get to 10345 to 10200. Need some higher level information to do that transformation. Sounds like CFI.

Ken Haase’s experimentation showed if the paragraph is sorted alphabetically, it creates a canonical reference which can be used to find the passage if there has been a wording change; may not be much other use otherwise. You can’t reconstruct the Steve Jobs book from the references but if there is an updated edition it’s fairly easy to see where the references will go.

**Comment:** It’s fairly important for preserving the value of the annotations for other systems to be able to reconstruct the context of the annotation. My problem with this solution is that it deliberately obscures the context. I question whether there is a real requirement for this. I know, theoretically, that the full text of a book can be copied this way, but full text can be copied from a paper context or screenshots. You risk hurting what annotations are for—risk losing their power.

**Response:** There’s a rational understanding of relative worth and then there is business motivation. These are not always tightly aligned. Content-oriented bodies espouse this issue as a concern. We’ll need to find a way to address the concern. One way is to engage in a dialogue and say, “You shouldn’t be worried about it.” Another way is finding some method and moving along. Having a way that does it will increase adoption.

It’s important for systems that don’t have full access to the content to be able to reconstruct the context. You have to have paid for the content in order to see the annotation.

**Q.** If you don’t have access to the content, why do you want to see the annotation?

**A.** A review of the book is considered fair use. Interesting aside: many people think that what material we have attributed to Aristotle is actually reconstructed from annotations’ people put together “class notes” when they studied with Aristotle. Their comments talked about what a great writer Aristotle is, but actually what we have is poorly written, so was it his original work?

**Comment:** We need to formulate a glossary of terms so we use the same language.
EPUB 3 and Annotations and Linking – Bill McCoy, IDPF Executive Director

Annotations and linking are related concepts as seen by IDPF. Less was done in this area in EPUB 3 than was originally hoped.

A CFI is a canonical fragment identifier. There is an RFC covering reference pages or named destinations, but it doesn’t support referencing part of a sentence. It was desired that a fragment ID be able to be applied specifically to a bookmark to have the capability to reference an arbitrary sequence of information.

Benefits of CFI:

- Canonicalized – If A & B reference the same location they will be equal.
- Robust in the face of transformation of the destination in XML; like adding or removing whitespace.

Downsides:

- Not hand-coding friendly.
- If you don’t want this precise location, but prefer something higher level, then it’s not suitable.

You might dislike CFIs for those reasons, but there are emerging applications which are using it.

Additional functionality in this area as part of the EPUB specification was deferred due to schedule constraints and lack of consensus in group (refer to Mr. Gylling’s presentation in Frankfurt). However, the group had a fair bit of discussion around requirements (see code.google.com/p/epub-revision/). Discussing the scope humbled them a bit, and the group spent some time considering what is an annotation. (See: code.google.com/p/epub-revision/wiki/UpdatedEpubCfiProposal.)

Published vs. private annotations – There are a lot of things someone might consider an annotation, especially when you get to readers’ private annotations. Authors and readers might see things differently. Annotations may be published within a study group or a class; they could be semi-public to totally public.

An annotation is a publication itself —like a document. It has a creator, origin, identity, etc. The IDPF group determined that annotations and linking are the same thing. Since an annotation is a publication and publications can have links, they came up with a “Unitarian” view of what needed to be done—before they decided it couldn’t get done in the interests of publishing EPUB 3 as a whole.

An annotation needs both a body and an envelope and metadata; it’s not just a publication, but a publication that has a target. The IDPF group spent a fair amount of time looking at inter-publication linking. Once you have EPUB and you have strong links, you have everything you need for annotations. However, loose links are a much more difficult problem; there is a hard line between loose links and strong links.

Because EPUB is based on web standards and is civilized HTML5, we must use URI syntax. We’re operating in “concrete format land.” Given that this solution must support fuzzy links, how should it be done? Some possibilities considered in IDPF discussions:

- Custom scheme – Some criticism that this approach is “evil.” XRI spent many years trying to solve the fuzzy link problem; had a custom scheme, but it failed. (The
failure may not have been strictly tied to its custom scheme but some made that argument.

• PURL-based EPUB identifiers – PEIs and DOIs. They have some advantage over a Uniform Resource Locator service model, whether hosted by IDPF or in a distributed manner. One could identify a title that the reading service knows it has on the bookshelf or one that needs a remote retrieval.

• Link resolver services (OpenURL) – Has a certain amount of adoption in some quarters, but might be seen as niche in a horizontal standard like EPUB (like PDF or HTML). The requirement is not just for books, journals, and scholarly publishing; this same problem occurs with DOIs.

After this discussion, the IDPF group determined that it wouldn't be able to come to closure and decided to finish the definition for CFI before moving on.

Some applications of EPUB 3 CFI:

• Adobe Digital Editions bookmarks – They have documented their scheme; see the EPUB wiki. An XML specification for annotations file uses a CFI-like scheme for both EPUB and PDF.
  o Bill McCoy advises this bookmarking group: Don’t work on one format; there’s enough PDF out there. Adobe has defined this fine-grained fragment.

• Hong Kong company ASTRI has created and published an alternate proposal for annotations.

• Barnes & Noble has created mapping between fixed layout and flowable text and is using CFI.

Other ideas offered by Bill for consideration by this group (one came up explicitly as IDPF was winding down its work last year):

• Don’t try to pack everything into the URL. Because EPUB is a composite, what if there were links to a landing/intermediate document in the package—like a citation. Even if there were nothing to machine-process that link, there could be some human-readable material, perhaps microdata, where there could be a machine that knew better, which could deal with it—go out and seek farther.

• Another thing is the Open Publication Distribution System (OPDS) that Peter Brantley and Hadrien Gardeur have worked on. There was a feeling in IDPF that this was not just about EPUB—not just annotations in this publication entity— but affiliating and syndicating large amounts of stuff. Atom seems a good fit; perhaps there is a way to build on OPDS.

Current status at IDPF is that there is a long laundry list of things not completed in EPUB that were part of its charter which IDPF membership wishes to pursue. IDPF feels that work on annotation and bookmarking is occurring here. If there are data structures or file formats external to the publication representation, this group can call on IDPF to help define those. IDPF has global interest and will be watching this closely. IDPF supports this work and wants to help; feels there is unfinished business. Maybe that this group defines the scope of this work such that there is work that IDPF has to pursue separately. IDPF would be delighted if this work leads to fulfillment of aspirations of EPUB in this area.
**Q & A for Mr. McCoy**

**Q.** Are you guys working on the next iteration of EPUB—making the container more permeable so web services can come in and go out?

**A.** Next version of EPUB is not the way we think about it anymore. Instead, we are pursuing more modularized development and capabilities for EPUB, like CSS3 modules, hopefully without waiting 3-4 more years for an EPUB 4.

**Comment:** it seems that while working with these issues, we not only tried to imagine what a fragment pointer could look like, we spent a lot of time thinking how to point to a specific version or how to move from a browser to an EPUB reading system. What you explained with PEI: different schemes are how we connect from one to the other—how to move from where we share links and information to the place where we read them; probably a mistake. We shouldn’t be concerned about spending so much time to inventing ways to move from one to another. Focus on pointing to e-books rather than solving other problems on the side.

**Response:** We tried to not solve those problems in EPUB 3; we tried to solve the pointer problem. Disagree with the comment; you’re drawing a line between EPUB and the browser.

**Follow-up:** Even if you don’t draw a line, it was seen as something that was clear during EPUB development.

**Individual “lightning” presentations**

- Ricky Wong, Mobnotate
- James Bridle, BookTwo
- Henrik Berggren, Readmill
- Ken Haase, beingmeta
- Laurence Bricker, Social Book
- Brian Hoffman, NYU Libraries
- Rob Sanderson, Los Alamos National Lab
- Corey Menscher, Findings

**Brainstorming discussion regarding how best to identify text to which an annotation may apply**

Topics discussed:

- What kind of architecture should be used
- Distrust of quoting passages / distrust of offsets
- How to define fragments –use of a single method or different approaches for different media
- Serialization of fragments
• Valuable high-level properties that will ensure robustness in the face of change
• Exact matching / rough matching

One size fits all solution will likely not work; we should find something which is extensible.

Round-robin on which solutions developers are using for this problem:
• Code on browser selection range – Go by the DOM structure; not so different from CFI.
• Smorgasbord of techniques – XPath, character counting, text hash, percentage from book, proximity in book.
• Unique element ID on paragraph and link secondary IDs (and assign these up front) – Compute a paragraph text representation to normalize white space and punctuation, sort strings, metrics on how far in the text the comment is. Fragment IDs are combined with work IDs to enable reference-rich points; can do references that are cross-work.
• Hashes and check full text of paragraph – Other web services may alter the structure of the document or change whitespace. Having full text of a paragraph is a fallback.
• Character offsets with whitespace and punctuation – This can provide rather precise boundaries in the context of a paragraph.

Some heuristics:
• Sometimes sentences will occur multiple times within a document, so they’ll have the same hash. Looking at the sentence before or after may not always work so well. Don’t take the sentence just before; take another somewhere before it, and get its hash. Then look for the paragraph with this hash that occurs after the paragraph with the other hash.
• Identify batch elements and have different rules for different elements.
• If fragments point to image or video, it can use media fragments to represent time-spatial information. Can use multiple fragments, but cannot rely on the paragraph—need to select any XML object.

Summary of techniques:
• Structure (XPath, pointer, CFI, selecting paragraphs) – Needs the most discussion of all of them.
• Position: absolute vs. relative – Probably should be given sizeable weight. (Should it be “privileged”?)
• Content-based, string matching, hashing, with some amount of fuzzy/pure matching.
• Divide and conquer approach – “It’s this paragraph, and I’ll identify it somehow. It’s this part of the paragraph and I’ll figure out.” Could be done in any combination of the three.

The “right” solution could be a mix of imperfect ones. If the reading system doesn’t understand a particular element, it will have to rely on others. So two of the three should be required—not just fragments, but should require position or text.
Cannot have a requirement that the annotation service holds the content. Better to create something which is decentralized and can work for people who don’t have control of the content. Ability to use decentralized content will support capability for services to communicate with each other and new services to be built to add further value.

• Shouldn’t prevent people who have control of the content from doing something simple that works for them.

• However, when it comes to interactions and interoperability, it would be great if those who had that control could describe what they did and ship those instructions along with a fallback. If you do understand their method, which may be idiosyncratic, look at the description. If you don’t understand (which will be more common), then look at the next part: this percentage in, this sentence, etc. This also seems the way we would work with IETF and W3C fragments.

Serialization of content, another constraint – All information cannot be expressed in the same line. The annotation will need to be represented as a resource and serialized in whichever way the group chooses. Pick one or allow several forms of serialization?

• Each service provider could decide but it would be best if there were one or two ways.

• All developers in the room generally use the same method: JSON or XML.

• The container with the basic information needs to be defined, as well as the things expressed in the container and any restrictions applicable to them.

• Regarding absolute character count – This is useless if you don’t have a total count of characters. If the content changes and you see a different total coming, you can see that it’s changed. Could also use percentage and a float with a range.

• If you define a way to serialize this information as XML, you can have the annotations supported in a file. Can’t just publish and distribute a protocol on the web, but can include the information in a file. Could be important to a lot of people.

• A bunch of annotations could exist independent of any server—served as Atom or another stable format where you have the annotation and a URI.

• How should this be serialized in RDF? We have three different kinds of constraints, not three different constraints. Relationship between the elements in RDF might not come through if serialized in another format. We would need to create bidirectional mapping in order to go from one to the other.

• Does this container also serve to hold the metadata about the annotation?

Use as many different sets of constraints as possible that can help locate the relevant passage. Percentage, absolute character counts, IDs, XPath, content, hashes can all work if there is some good way of ranking them.

The challenge is identifying text location when text of different editions changes. Services which can provide “concordance” services—identifying works—could be useful. It requires the publisher to use forethought in how IDs are chosen. Assists in fuzzy match/orthogonal precision/triangulation.
Different editions, different manifestations of the same work:

- If these are identified differently, there should be a higher level identifier.
- Have rules for which ID schemes are more robust across editions than other schemes. A ranking?
- NISO is an organization that deals with work identifiers. NISO hosts the ISO subcommittee that does ISBN, DOI, and ISTC.
- Need an authority that uses the same annotation semantics to link multiple versions together and note X is a version of Y, Z is a similar version, etc. Open Library does this via JSON libraries. An alternative fuzzy method is to identify books by a collection of different numbers/combinations, such as ISBN or title-author-date.
- If an annotation system is unable to identify it in another edition, take the human user as far as possible and make them aware of this in some friendly way: “This came from another edition. I don’t have access to that.”

(The following discussion refers to the diagram on slide 30. See: http://www.slideshare.net/azaroth42/niso-annotation-meeting-san-francisco.)

In the OAC diagram, we have a container with content (body), and a process for identifying/describing how you would find the content that would be outside. The body could have additional metadata separate from the annotation.

How should models be developed? Using RDF or some other way? The OAC model could be interpreted in different ways, not necessarily using RDF. A JSON object could hold the description.

The most complicated OAC data model diagram is this one, which has an annotation and a body that is part of another resource, and it’s about the target that is part of the resource. Some part of one thing is about part of something else. You can also have multiple targets and no body, for example, if it’s a highlight.

Use of the word “constraint”—are there other possibilities? OAC chose “constraint” because it’s more generic; can say I’m talking about this resource in this point in time, constraining an interpretation. But other words may be possible.

- Locator
- Selector
- Partitioning

Whatever is chosen, there must be metadata to make it possible to map constraints that link assets together. It should be possible in the document to identify where each thing belongs; this is not always obvious in XML or JSON.

The RDF model may possess “undesired expressivity.” We want the simplest solution that solves these problems. OAC team had a rule of thumb: to check whether it would be important for a use case to express metadata about something. If so, it had to be made as a new node; so, for example, the MIME type could be different. In this situation it may not be necessary for all nodes to have metadata, and collapsing them could be possible.
Next steps and NISO’s processes – Nettie Lagace, NISO

NISO’s processes are varied depending on the type of project. Basic process is that a new work item is proposed and sent to one of three topic (leadership) committees for review. Bookmarks and Annotations work item was reviewed by the Content and Collections Management Topic Committee, which deals with file and content structures, metadata. The proposal is subsequently reviewed by the NISO membership, which has approved this as a project.

Following these meetings, NISO will put out a public call for expressions of interest to serve on the working group, and this working group will use as input the material and discussions from this meeting and the one held earlier in Frankfurt. There may be a need to have subgroups formed to discuss specific areas.

The scope could be potentially broader than what was discussed today; it will be determined by the working group, with input from the Topic Committee, how to narrow it in a realistic way. It’s also possible the working group could recommend that other work items be created to deal with related issues such as work identifiers.

Further work will take place over the next 12-18 months with meetings perhaps twice a month or maybe even weekly in order to move quickly. This initiative wants to be as ahead of the curve as the industry is in developing products. After 6-9 months of development, the working group can present a syntax to the community as a Draft Standard for Trial Use so users can kick the tires for 3-6 months and submit comments. The working group will take the comments and further tweak their work; it will be reviewed again by the CCM Topic Committee and put to NISO members for final approval, submitted to ANSI for their approval as an American National Standard, and subsequently published.