# Accessible Reading Systems – webinar transcript

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<https://daisy.org/news-events/articles/accessible-reading-systems-w>

- [Host] Hello, everyone, and welcome to this DAISY Consortium webinar titled "Accessible Reading Systems: "Requirements and Examples of Good Practise". Okay, it's time to get started. I'm going to hand over to our guest host for today, George Kerscher.   
- [George] Welcome, everybody. This is a very interesting session about the accessibility of reading systems. People want to be able to read with their eyes, ears, and fingers, and it's the reading system that enables this, whether it's visually reading the text on the screen or enlarging it, if you have low vision, or using text-to-speech to auditorily present the information to you, and if you have a refreshable braille device attached, you can read it tactilely with braille. So to unpack this reading system solutions, we've put together a wonderful panel, and I'd ask that you introduce yourselves, and let's get going.   
- [Prashant] Hello, everyone. My name is Prashant Verma. I'm working as accessibility specialist for DAISY Consortium. I do trainings on creation of accessible books. I do accessibility testing and technical support.   
- [Lars] Hi, I'm Lars Wallin, and I'm a product manager, accessibility specialist, and a UX experimentalist at Colibrio Software. I make sure that all our, our products that we deliver to many customers have all the accessibility features needed to build properly accessible reading systems.   
- [Laurent] Hello, I am Laurent Le Meur, the CTO of EDRLab, a development laboratory and professional association focusing on digital publishing, which is based in France with a European scope. So we are the makers of Thorium Reader, a reading application for desktop. We will talk about it later. Readium toolkits, which are toolkits for, that developmental kits for mobile applications and web applications, and the makers also of LCP, an accessibility-friendly DRM. So, let's start with the agenda for today. I will first introduce the fundamentals of accessible reading. Then, Lars Wallin will speak about advanced document interaction, And then Prashant Verma will speak about the testing and benchmarking of reading applications. Let's start with the fundamentals of accessible reading and first accessible reading system. Why? Why is it now something hot, I would say? So one big reason is that in 2025, there would be in Europe an European Accessibility Act, and by then, every product and every service in use in European countries, not only those made in European countries but those sold and used in general in European countries, must be accessible. National laws should now be ready already. Most are not, but it will come sooner than later with the definition of legal responsibilities and fines for those who don't play the game. EPUB 3 is the accessible e-book format chosen by our industry because it has a clean accessibility requirement, and it tends to be able to replace the DAISY format, which was the special e-book format for people with reading impairments. Let's know that audiobooks are out of scope of this European Accessibility Act. So I would say that generic audiobooks sold on the market today won't have to have special accessibility enhancements, like a TOC, the table of contents. But on the other side, all e-books sold on this market will have to be properly accessible by 2025. And reading systems, so reading applications, are products, so they are in scope of the accessibility directive, and so they must be accessible by 2025. It's also interesting to know that DRMs, which are used in many countries in Europe and in the U.S. also, DRMs are impacted by this accessibility directive because a DRM which hinders accessibility, for example, forbids TTS, text-to-speech, must be removed from the market by 2025. So we have to make accessible reading systems because we must do it before 2025, but also because our organisations, so DAISY Consortium, EDRLab, Colibrio, have accessibility as a core value. And this is also the reason why we're there today. So the fundamentals. I will speak about the basics, and then, last, Wallin will speak about advanced features. So, the basics. The basics are visual adjustments. We must, a user must be able to resize the content, to change fonts, to change spaces, to change the colours on the screen, to zoom on images, et cetera. I will show a very short video. Yes, you see that here, we choose the bigger font, we choose another font, and we can choose to have another display. So, another layout. Here, it's calling layout. We prefer to have a larger word spacing. Letter spacing is okay. So, larger paragraph spacing, more space, and line spacing also. So if I found that it was a bit too compact, now I can read in a better way, and I can reset the configuration if I want to go back to the auto preferences. So this is about visual adjustments. Screen reader support. Screen reader support is also a must. The difficulty is that we've got many screen readers on the market. So on Windows, we've got NVDA, JAWS, on Mac, we've got VoiceOver, iOS VoiceOver also, and on Android, we've got TalkBack. So screen readers are software which is added to the operating system and which helps a user navigating lines, words, tables, lists, alt text of images, et cetera. The issue for us developers of applications is that screen reader support is difficult. It's difficult because there are different shortcuts, different versions between the different applications and few tutorials. So our developers usually don't have the expertise on screen readers, don't know the keys. So it's a bit difficult, but this is a must for reading system developers to learn how to use a screen reader and the different screen readers on Windows and on Mac, and to be able to complement what screen readers are doing with what they can do in their own application. Keyboard navigation is the complement I was speaking about for screen readers when there is a keyboard, but it's also true when there is a touchscreen and there are specific manipulations to do on the screen for navigating inside the application. So a keyboard must have detailed controls, like control between pages, going to the table of content, navigating the table of content, going back from the table of contents, et cetera, et cetera. In our application Thorium, we decided to have a large set of keyboard shortcuts, which are customizable. So the user can change the keyboard shortcuts himself if he doesn't like the default ones. This is also the only way we found to deal with the differences between the different keyboard shortcuts provided by screen readers. Then we can speak about text-to-speech. If somebody wants to listen to a book but doesn't want to use a screen reader, and it's especially good for people with dyslexia, they don't know how to use a screen reader as it's too complex sometime. It's too specialised, I would say. But they can be very tired after reading some text. So text-to-speech for them is really good.   
- [TTS Voice] Chapter 2: The Carpet-Bag. I stuffed a shirt or two into my old carpet-bag, tucked it under my arm, and started for Cape Horn and the Pacific. Quitting the good city of old Manhatto, I duly  
- I stuffed a shirt or two into my old carpet-bag, tucked it under my arm, and started for Cape Horn and the Pacific. Quitting the good city of old Manhatto, I duly arrived in New Bedford. It was a Saturday night in December. Much was I.  
- Okay, so you see that you can have a proper read-aloud with the, the layout that was offered by the author, but we can also, more or less, destroy the original layout to simplify reading during the read-aloud experience. Especially good for dyslexic people. So what are the implications of developing accessible reading systems? You have seen that at the EDRLab, we have an experience with that, with Thorium Reader, which is running on Windows, Mac, and Linux. So the difficulties we encounter. First, the team. The team, the development team must be aware of accessibility and must even become an expert in accessibility, which takes time. And you know, it's difficult to find developers, but developers who can become expert in accessibility is, well, complex. Then, development frameworks that we use. What we take as a ground for our developments are often imperfect when it comes to accessibility. So sometime, we need to develop our own user experience bricks, in fact, from the start to get something properly accessible. Documenting accessibility is also complex due to the multiplicity of screen readers, experiences, platform. So for Thorium, we are working on that with the help of partners, like DAISY, and we've got now, I think, a start of a good documentation online. The development budget for an accessibility application, accessible application, sorry, is high. It adds time and money to be highly accessible. For example, for Thorium Reader, which is a free software and an open-source software, we are always looking for small grants to get the machine running, so even if our members are providing a proper budget for that. The tests. The tests are complex because the app is complex, and it's easy to introduce regressions. But we are helped a lot by a small community of people. Some are blind, some are dyslexic, so they help us testing the system. Prashant will speak about the epubtest.org, which is a great site where we can put the results of tests, accessibility tests, and compare the applications and try to reach a higher score. So EPUB test is key for us, and for users, also, for sure. EPUB 3 versus DAISY 2 and 3, this is also an issue. We will maybe talk more about it later, if you like. But EPUB 3, as I said before, has been chosen by the industry, but still, DAISY 2 and 3 formats are there. So we must accommodate with that. And for example, in Thorium, we developed support for DAISY. And then, the last thing, which is sometimes complex, is buggy content, buggy EPUB or buggy DAISY. Publications are very often very surprising, I would say. And it takes time to be sure that we can accommodate this buggy content with the proper user experience, especially when it comes to accessibility and people can be totally lost because they don't have sight. So this was about the fundamentals of accessible reading systems. Our next speaker is Lars Wallin, who will will detail advanced document interactions.   
- [Lars] Hey, everyone, this is Lars. And as Laurent so kindly introduced me with, I'm here to tell you a bit about what I've learned when I've developed and consulted with customers that work with structured documents, documents which is often maybe learning materials, for example, academic material. And for, to give a really good reading experience when having these types of documents, there are a couple of points here that I would like to go through. Focus management is one of the bigger issues, and this is also something that Laurent pointed out before when it came to using a screen reader with existing, existing UI frameworks, first of all. I would say that if they have not been developed with screen reader access in mind and keyboard access in mind, they will not have proper focus management, which makes it almost impossible to build anything more complex. So that is the base setting for all of this. You need to have a UI framework that works well with and has a well-integrated management of accessibility focus. And then I'm going to discuss a bit when it comes to landmark navigation, which is very important when it comes to complex documents, highlights, bookmarks and notes, which is also a very important part of academic use, contextual actions and contextual information while reading, which is also super important for in order to make sure that the reader doesn't lose their place, so to speak, within the, within the document while reading. Text search is also super important, of course, when trying to work with large amounts of text in a fact-based publication or, again, in learning material. And then also, I have wanted to discuss visual aids, which are maybe more advanced than just enlargement of text and changing fonts and themes, and so on. So focus management. Always try to place accessibility focus at the correct location within content. This is something that when you try to have this, you describe this as a feature, it sounds almost silly for people who are, don't have problems with their, with sight. But for a blind or sight-impaired user, this is a real problem, and that becomes very apparent when you try to develop and get your hands on a screen reader. You will soon see that it's very, very easy to lose place because the accessibility focus, in other words, the content that the screen reader is actually narrating, that you end up in the right place. It's very easy to get lost when using the screen reader to navigate. It's easy to plan for because it's super intuitive, what should happen, but because of screen reader implementations, it's very, very hard, especially if you have a hybrid, a hybrid environment, such as, in Thorium's case, you will use Electron, and in iOS and Android, you use WebView when you're making un-native applications. What I've realised is that if you really want to make a complex application that has a lot of features, that it relies a lot on model, somewhat, notes, you should use everything. Just develop the entire user interface within the web, with using web technologies, basically, so you don't have any conflicts switching between native components and web, the, the web parts, so to speak. Good to know that all reading systems use WebView. So you always have a hybrid application when you create a reading system. Landmark navigation is super important when you have structured documents. When I say structured documents, I mean, you know, learning material that have a lot of headings, figures, tables, lists, asides. In order to be able to effectively traverse through these and find your way when you use a screen reader, it's really important that you, that you can display these in some kind of UI so that the reader can easily jump to a very specific heading, for example, or go to a very specific figure or whatnot in the UI, so that you make it as easy as possible for the user to find their place in the book. This is so very important. You will soon see when you try to implement this feature, that most figures, tables, and lists don't have any meaningful metadata. So it's really hard to describe them to a non-seeing user. So I would urge you to not only think of images when it comes to alt text and so on. Tables and lists also need labels or some kind of metadata so that they can be surfaced in the user interface in some kind of index, so to speak. Yes, so that's landmark navigation. I may have a video showing that.   
- [Narrator] This video clip shows a science textbook which has rich structure. A keyboard shortcut opens the Landmark dialogue, listing headings, tables, figures, and lists. Headings are expanded to show the topics and levels. Figures are also expanded, listing all of the images. An image is selected, and the focus jumps to that item in the book.   
- [Lars] Highlights, bookmarks, and notes are, of course, also very important for students, especially when you study for exams and whatnot, but also for teachers that want to maybe add notes or highlights or whatnot, or bookmarks for that matter, and share with students. It's very important that you have those working with, for non, you know, people that have special needs. Again, highlighting, note-taking, and so on is also extra hard when you work with a screen reader because the screen reader does not really tell you where it's narrating. So, for for reading system developers, it's a bit tricky, in many cases, to actually know where the screen reader has its cursor, so to speak. But we've come up with solutions to solve this. And also, sharing links to annotations and bookmarks, cross-users, and reading systems is something that I find too would be of great help. So, and we are in talks with Thorium to make sure at least that these reading systems or reading systems that use us, Colibrio, and that, and for schools and people that use Thorium, that we can exchange annotations and bookmarks and notes seamlessly.   
- [Narrator] In this example, a passage is read, marked, and then highlighted through the App Actions dialogue. The text is then reviewed in the Highlights View and edited to apply a note.   
- [TTS Voice] Clickable frame, "All atoms are made up of three main particles: "protons, neutrons, and electrons. "As summarised in Table..." Start marked. "2.1. The -1 charge of one electron balances..." Copy to clipboard. "Atoms are made up of three main particles: "protons, neutrons..." Heading level 2, close dialogue. (application beeps) App act, open, expand act, highlight act, expanded. Highlight clipboard... Select, alert, highlight added. Alert, visible content has highlights. Press Alt+Shift+H to list them. Selected previous, open main... Heading level 2, highlight in view. List with one item. Edit highlight button... Heading level 2, highlight button, close dialogue, highlighted text, close dialogue button, go... (application beeps) Highlighted text, note edit, (vocalises) E-S-T. Yellow, Save but... Out-of-frame button previous.   
- [Lars] Contextual actions and info. This is also important that stuff that happens in the user interface is communicated back to the user. This can be done in different ways, but I find, again, that this is especially tricky, of course, when you have non-seeing and non-seeing readers or people with sight impairments that, things that seem intuitive for us, as... If you, if... And when I say "us", I mean people with, you know, full, fully-workening, (chuckles) fully-working vision. That it's a bit tricky to, to kind of see that we need to provide information on, for example, where you are in the book at any certain time, when there is a bookmark or an annotation in the contents that is onscreen, that you also need to make the screen reader tell the user this and also to provide context actions so that they can actually get to these active bookmarks, annotations, and highlights, for example, easily without needing to go jump through extra hoops. Yes, and also, if you have a scrolling view, for example, that you can tell the user when they are at the top or at the bottom of the page, for example. Let me present to you the wonderful Prashant, who is going to tell you all about testing and benchmarking. Thank you very much.   
- [Prashant] Yeah, thanks, Lar. So for an accessible reading experience, it is necessary that both the content at the EPUB file and the reading system, which is the app or the hardware, both of them conform to standards and best practises. Tools are available to test the validity and accessibility of the EPUB file. There are many tools, like EPUBCheck, Ace and SMART. We are not discussing them in this webinar. We have discussed them and demonstrated them in earlier webinars. Today, we are talking about the reading systems, which must be tested for accessibility features required by the users based on the user requirements and best practises. So if the reading system needs to have an accessible user interface, it is necessary that it works with different input methods, such as a keyboard, mouse, and touch. People with different disabilities, based on their capability, sometimes use a modified keyboard or a trackball or a touchscreen to interact with the reading system. So the application needs to support the various input methods. It also needs to support common assistive technology, such as a screen reader, magnification tools, and braille displays. The reading system needs to support the accessibility features. For example, users should be able to find the table of content or navigate by page breaks. The reading system should have support for image alt text. It should expose the alt text, if available, in the images through the assistive technologies. It should also support visual adjustments. Users should be able to adapt the visual presentation according to their requirements. They should be able to change the text size, the line spacing, word spacing, font, even the background colour and the foreground colour. So the app needs to provide these features for the users. The app should also have a Read Aloud feature. It should be able to use text-to-speech to allow the user to read aloud or hear the content of the EPUB. DAISY Consortium, with partners, has developed epubtest.org. This is a website which contains a testing framework for EPUB reading systems. The EPUB reading systems are being tested by accessibility experts and users, and these evaluations are published on epubtest.org. The EPUB reading systems are tested with different combinations of assistive technology, operating systems, and where applicable, different browsers and hardware. For example, a reading app is tested with NVDA screen reader on Windows. The same reading system is also tested with other screen readers, like JAWS on Windows, and you will find their test results on epubtest.org. Many apps for the mobile platform have also been tested, apps for Android as well as iOS. And the testing has been done with different screen readers and also with some braille display devices. The test results are helpful for the developers in improving their products. They are able to check and understand which tests are not supported and the reason for it, and then they can accordingly make some improvements in their apps. Test results help the institutions procuring the reading system which is most appropriate for their clients. If they have... If they are serving a person with a certain disability, then they can check the EPUB test results and accordingly select the app which is providing maximum accessibility and flexibility to that group. On epubtest.org, there are test books. These books contain different tests. The tests are grouped into two categories: Fundamental accessibility tests. These contains those tests which all reading systems are expected to support. These are considered to be necessary for providing accessibility. They are further grouped into basic functionality, non-visual reading, visual adjustments, and Read Aloud. And then there are some advanced accessibility tests. It is desirable that reading systems support these tests as well. So there are tests designed to check support for media overlays, tests for testing extended descriptions. And in these tests, you can also check the best practises, different best practises for providing image descriptions are included these test books. There is a book for testing support for mathematics, and various best practises or techniques for including mathematics in EPUB are included in these test books. The test books can be downloaded from epubtest.org. You can go to this website and you can check the Test Books page. There, you will find the various test books which are currently onscreen. All of them are available for download. Developers can download these books and load on their reading systems for testing. So the tests have to be marked as either Pass or Fail, and testers are expected to provide comments in the Notes field as to why a particular test failed. The comment should be helpful for others in reproducing the results. So on epubtest.org, you can see the Results page. There, you will see a listing of all the evaluations conducted so far. You will see combination of reading system with different assistive technology and their score in different categories. So based on the pass and fail result, that pass and fail result is converted into a percentage, and you will be able to see how the chosen reading system and assistive technology combination performed, for example, in the non-visual category. If you are selecting a reading system suitable for visually-impaired users, then probably you will be more interested in the basic functionality and non-visual category. Whereas for some other disabilities, you will be interested in checking the support for visual adjustments and Read Aloud. On inclusivepublishing.org, we are maintaining a Reading Systems Accessibility Support Roundup. This page is regularly updated. This page contains a easy-to-read summary of the detailed accessibility testing which has been conducted, and the report is available on epubtest.org. And kind of an comparison or easy-to-read comparison of the popular apps is available in the roundup, and it is posted on the inclusivepublishing.org. So the pros and cons of various EPUB reading apps is mentioned in this roundup, any accessibility feature that works well, or if there is some concern or something that doesn't work well. So that, we try to include in this short summary. So the reading system roundup can be a very useful, valuable resource for people who want to check or compare the accessibility of various reading systems. For details, after having read the roundup, and then if you are interested, you can visit epubtest.org and open the evaluation of that particular app. There, you will be able to see the result of each test and also maybe a comment as to why that test was supported or not supported. Okay. So I think I will now pass on to George for the next segment.   
- [George] Well, guys, that was just terrific hearing about all the techniques and what's being done to support the development of accessible reading systems. And we've got a few questions in. Prashant, do you have plenty of people volunteering to do testing? Are there more people that could be volunteering? What is the skills? How do they get signed up? Tell us about that.   
- [Prashant] Yeah, new testers are welcome. We would like people to join us to test the accessibility of reading systems. So the next step is to go to epubtest.org. There is a page called Participate. There, from there, from that page, people can write to us if you are interested in becoming a tester. We will create an account for them. They can discuss with us the reading system that they are interested in testing. Or from our side, we can also suggest them to test a particular reading system and AT combination which has not been tested earlier. So they can download the test books, load in their reading system. When they're logged in, they will find a online form in which they will fill in their testing results. And then, finally, it is reviewed and published. So we also invite developers to have a look at the test results, to download our books and test their apps, and if they have questions, or if they would like to work with us to improve the accessibility, then they can also contact us through this Participate page.   
- [George] And is the testing only done in English, or is other languages supported?   
- [Prashant] Yeah, other languages are also supported. And yeah, we would like to do testing in some other languages as well. Currently, most of it, most of the published results are in English, just a few in other languages. And we would like testers who work with different languages to come and join us.   
- [George] Great. Laurent, so there's the DAISY formats, and there's the EPUB formats, and I believe Thorium also supports the presentation of PDF, but how do you see the reading system helping in transitioning between the DAISY formats and the mainstream EPUB 3?   
- [Laurent] Yes, George, Thorium has been developed as a multi-format reading application, meaning that we would like a user to be able to put together in the catalogue of Thorium Reader all e-books he has, whatever format it is. So it covers, as you said, EPUB 2 and 3, DAISY 2 and 3, PDF, all e-books, and specific comics. More specifically about DAISY versus EPUB 3, the DAISY format, so we see that there is a large production still in DAISY 2 format by specialised associations, and they have issues moving to EPUB 3 at the moment because they don't have the workflow or they don't have the skill or they don't especially have users who use EPUB 3-compatible devices. So we know that the big problem at the moment is that many specialised devices only read DAISY, not EPUB. So until this is solved by specialised devices like HumanWare, we, makers of generic applications, we must fill the gap, in fact. And we must fill the gaps, therefore we must be able to support correctly both EPUB 3, because this is the future, and DAISY because this is the present for blind people, essentially. This is not easy because the DAISY format, there are many, many flavours of DAISY, I would say. We discovered one yesterday from Japan. And we must play with the different, the variability of the DAISY format. But okay, if we've got enough feedback from users with samples, we can deal with that. I think that several... We would need, globally, at least one reading application for Windows, one for Mac, one for Linux, one for mobiles, free applications able to read both EPUB 3 and DAISY to cover this time, this time of transition between DAISY and EPUB. So for Windows, Mac, Linux, Thorium is there, Thorium is free. For mobile, maybe there will be a need for an equivalent software.   
- [George] Okay, we have a question from Anna, who is primarily selling content on the Amazon Kindle and in VitalSource, and they do testing there. What do you recommend they add to their testing process to make sure, to make sure we're creating accessible publications on the platforms we're targeting?   
- [Laurent] Well, I will just start maybe saying that, for example, in France, publishers, and especially (indistinct), they are now using iBooks on Mac and Thorium on Windows to check their EPUBs and their accessible EPUBs especially. So my recommendation would be to add Thorium to the set.   
- [George] Prashant, what about EPUB test and Kindle?   
- [Prashant] Yes, so I think EPUB is accepted by Amazon Kindle and VitalSource as an input. So they should try to create an accessible EPUB. They can test the EPUB thoroughly. And as far as the EPUB test is concerned, so there are different tests over there to, for different reading systems. They can maybe choose one of the reading systems, maybe like Thorium, to test the experience. And then I think when it is uploaded in Amazon Kindle or maybe VitalSource or any other platform, so mostly all the accessibility features will be carried for one.   
- [George] So in talking about the Kindle and VitalSource, I believe that both those companies have ingested the test books, and so you can test VitalSource reading system with those test books because they're cooperating with epubtest.org and ingesting those titles. Is that correct?   
- [Prashant] Yes, yes. And their test results are also available on epubtest.org.   
- [George] Okay, so we have a question. Maryanne to Colibrio. "What is the best order to implement the features, "thinking of media overlays or text-to-speech, "if we wanna start with the easiest function?" So this sounds like from a, from a publisher's perspective, I think?   
- [Lars] Yeah, they develop library systems. But I think this regardless of app developer, yes. So regardless, I think if, if they use Colibrio or if they use any other framework, I would absolutely (chuckles) if, yes. So I would start with the text-to-speech because that's the most bang for the buck, so to speak. You reach most people with that solution. As you reach both people who are sight-impaired, you reach people who are, have dyslexia and also people who have ADD and want to read and listen at the same time. So... And if you use Colibrio, adding media overlay support is just no biggie. So I would definitely start with the text-to-speech feature, again, regardless of which framework you use. You will help most people with that feature. So that's my idea here. And if you want to try your books, by the way, demo.colibrio.com is also a good place to test your books. I have some nifty features that I've added to make it easy to look for images without alt text and so on.   
- [George] So we have another question for Lars. You talked about tables and needing more metadata. I'm wondering, are you suggesting that more than proper table column and row heads, where appropriate, are needed, or what are you thinking of in terms of what more is needed?   
- [Lars] Yeah, exactly, and this is not obvious. This is just from, you know, we need to surface data in order for reading systems to be able to display like these overviews and so on. And if you don't have any, some kind of labelling feature which is very tightly connected to the element that you want to describe, it's very hard to write generic or general code to actually surface this metadata. So I would say, one thing is an ARIA description, an ARIA label, or maybe just a label tag. These all help us reading system developers to show this metadata in overview lists, as I explained before. And this, we should probably write some kind of best practise or whatnot for this. But it's just that when you try to do this, these kinds of features, which I really think are necessary for any student to be able to, again, find their way in very complex documents, it should be some kind of, it should be a best practise to label any list or any table or any math equation or whatnot in order for reading systems to be able to surface this data to the reader. In our  
-   
- Good.   
- [Lars] Yeah, sorry.   
- [George] Yeah, yeah. I think we would really need to flesh this best practise out to make it more clear about what exactly to do here.   
- [Lars] Indeed, indeed.   
- [George] I have another question for all. Many of the commercial reading systems lock the content that is purchased and is read on their platforms only. And then there is other content that you can obtain from other sources that is not protected. So it seems like everybody has to learn at least two different reading systems, one for where they get their commercial books and one where they get everything else. Is that a problem? Is there any workaround for this? How do you deal with... What do you think of this issue?   
- [Lars] I think it's not something we... I don't think there is any real way, with all the subscription services and so on coming online now, to really solve it. But it sure would be super nice if you could actually own a book and open it in any reading system you'd like. And so, speaking to Robbie's question, which is maybe the next question up, it would be super cool if we had full interoperability between all reading systems, but I guess that's not how we buy books these days, right? (chuckles) So, yeah. It would be nice.   
- No, it can  
- We tried to do that by promoting an interoperable DRM for those who want to use a DRM, which is LCP. So LCP, well, helps retailers to sell or libraries to loan e-books with the same technology. And this technology, when it's well-used, allows the user to download the book in any reading system he wants, provided the reading system supports LCP. So this is the goal. At the moment, we still have many providers of e-books who are using appropriate IDM okay? So no interoperability at all, by design. Others are using the Adobe DRM, which is obsolete. And others even are using the LCP DRM, but try to close the use. So Lars was right saying subscription services, usually, they lock the system to their own application and forbid the export from the application as something that can be downloaded in any other application. So we can't do much but try to convince people that it's not the best behaviour.   
- [George] M'kay. We have a question from Robbie about annotations and shared annotations and, and how can we isolate our own notes and share some of them with other people. Who would want to try to address this?   
- [Prashant] Hm.   
- [Lars] I can start by saying that I've thought about this a lot. And we use, I think it's so... And I've been discussing this a lot with Laurent and also with other people who develop reading systems, and we, at Colibrio, really want people to use the web annotation standard and open annotations, and we do so. We follow the spec. And if we can just, as I've said again, we have had these discussions, and the plan is at least that we and Thorium will have interoperable annotations. And in the end, I think when it comes to which annotations should be private and which should be, you know, open and public, that's I guess up to the reader in the best of worlds, right, that they can decide which to publish in which channels, so to speak. So you can both use annotations for social reading, like in book clubs and in classrooms, but also keep them for yourself if that's what you want. I'm also promoting that we should have stateful EPUBs, so that if you actually own the EPUB, you can save the annotations and bookmarks and whatnot within the package. I think that's something that is going to be needed if we want to make EPUB something that is comparable to PDFs. But yes, I agree, Robbie. Interoperability is key.   
- [George] And Hypothesis, are they  
-   
- Yeah?   
- [George] Are you collaborating with Hypothesis and  
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- No, not at the moment.   
- We did that before. At the level of EDRLab and Readium, we did that before. We included the Hypothesis in the Readium GS software. We have still the links, I would say, inactive links at the moment with Hypothesis. But when we activate this process of having shareable annotations with the Colibrio, for sure, we will discuss with Hypothesis how it could be interoperable with them also.   
- [George] Yeah. You know, Lars was talking about the problem of, where is the focus, where does the screen reader have focus? And I know that this is one of the major problems with annotations. You wanna put an annotation on a particular paragraph or something, but the reading system kind of doesn't know where the screen reader is. And getting that focus is... And in our testing, we see that annotations are one of the biggest problem areas that we have. Well, we're getting close to the top of the hour, and I want to respect everybody's time. This was just a terrific presentation. Lars, Laurent, Prashant, thank you very, very much.   
- [Host] We're coming to the end of this session now. Once again, thank you to Laurent, Prashant, and Lars for sharing their expertise and to George for guest-hosting today. These accessible publishing and reading webinars are brought to you by the DAISY Consortium, a global nonprofit organisation. Their expert team and members work on innovative and impactful initiatives to further their mission to develop global solutions for accessible publishing and reading. Before we close, I want to tell you about the next DAISY webinar. In two weeks time, on November 9th, we will hear about the lessons learned in the journey to accessible publishing. If you encounter a challenge on the road to accessible publishing, the chances are you're not the first. In this session, we will reveal the issues that arise again and again and hear how they're addressed by companies as they get ready for the European Accessibility Act. If you have any ideas for webinar topics in the area of accessible reading and publishing, including any that you might contribute to, we'd love to hear from you. Well, that's it for this session. We hope you'll join us again soon. And in the meantime, thank you for your time, stay safe and well, and have a wonderful rest of your day. Goodbye.