

Digital Preservation Team	Preservation Assessment: Sibelius Preservation Assessment	Date: 26/02/2020
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Sibelius Preservation Assessment

Document History

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1. Introduction

This document provides a high level, collection specific assessment of the Sibelius music notation format with regard to preservation risks and the practicalities of preserving data in this format. This format assessment is one of a series of assessments carried out by the British Library's Digital Preservation Team.

1.1 Scope

This document focuses on the Sibelius software which allows the creation and editing of music scores and the format it produces for the digital representation of sheet music (.sib).

Note that this assessment considers format issues only, and does not explore other factors essential to a preservation planning exercise, such as collection specific characteristics of collections. These should always be considered before implementing preservation actions.

1.2 Summary

Sibelius is proprietary software designed to compose and edit music. It generates music scores in a proprietary format known as Sibelius or SIB, which uses the file extension .sib. This represents the musical notes that are created, but does not in itself contain any data related to the audio [1].

Sibelius is categorised as scorewriter¹ or music notation software, and it is widely used by composers, musical arrangers, performers, music publishers, teachers and students, particularly for writing classical, jazz, band, vocal, film and television music [2].

2. Assessment

2.1 Development Status

A summary of the development history of the format and an indication of its current status

The Sibelius software was originally developed for the Acorn Archimedes computer in 1986 by the British brothers Ben and Jonathan Finn whilst they were still at school. The software wasn't released to the public until April 1993. It was first released for Windows in September 1998 and for the Apple Mackintosh a few months later. In August 2006, Sibelius Software was acquired by Avid Technology [3], a US-based software and hardware manufacturer, who have continued to develop the product [4].

From June 2018, Avid started to distribute Sibelius with a new year-based versioning system (e.g. Sibelius 2019.12), with the software marketed as three products incorporating different levels of functionality [5]:

- Sibelius First – a freely-downloadable program with limited export functionality that can be used to create “simple scores” containing up to four instrument parts (staves). According to an Avid blog [6], Sibelius First is able to “open any Sibelius file going back to version 1.0 to 2018.6” and can also open files that have more than 4 staves, although these would only open in a read-only mode.
- Sibelius – available by subscription or purchase for the creation of “rich scores” containing up to sixteen instrument parts
- Sibelius Ultimate – available by subscription or purchase for the creation of scores containing unlimited parts and custom layouts

Sibelius Ultimate is the premium (and most expensive) product, building on the functionality of previous full versions of Sibelius, e.g. version 8.5.1 from 2017 [7]. Sibelius and Sibelius Ultimate can be acquired via monthly or annual subscription or can be purchased with a “perpetual license” (although updates may require subscription to annual software update and support plan). Sibelius Ultimate can additionally be acquired by trading-up from other notation software or through network licensing.

Almost all scorewriter software saves files in their own file formats and Sibelius is no exception, using its own proprietary format with the file extension .sib.

¹ Wikipedia: “scorewriter, or notation software or music notation processor, is software used with a computer for creating, editing and printing sheet music” [49]

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2.2 Adoption and Usage

An impression of how widely used the file format is, with reference to use in other memory organisations and their practical experiences of working with the format

At the time of writing (2019), Sibelius is the world's best-selling music notation software and therefore by implication, the `.sib` format will be one of the most popular formats for generating digital music scores [8]. The target audience for the program means that the format will probably mainly be used to create and edit music notation (e.g. by composers and arrangers) rather than as a format for publishing music scores.

Specific information on the presence of Sibelius-based content in memory institutions is scarce, although several institutions have some content in their collections.

To date, the British Library has received some digital sheet music in Sibelius format via donated unpublished collections (e.g., the Karel Janovicky collection) [9]. This remains an anticipated area of growth for unpublished music collections. Planning for the ingest of digital sheet music as part of Non-Print Legal Deposit (NPLD) commenced in 2017, although this has initially focused on formats used by publishers to distribute content, to date primarily PDF, but which may also eventually include MusicXML.

The Library of Congress does not have the Sibelius format listed in its list of recommended digital formats though it is mentioned in relation to the MusicXML standard [10].

The University of York holds some Sibelius files and in 2017 it ranked in the top 10 formats in their digital archive [11]. Massey University recommended both Sibelius and Finale files as formats for digital sheet music but also requested (and in fact only ingest) an additional PDF file [12]. Contemporary Music Centre Ireland has guidelines which allow Sibelius scores to be submitted to their digital archive of scores by Irish composers [13]. According to a report by the Digital Repository of Ireland, Scorch, Sibelius' web browser plugin (now marketed as a sheet music app) has been used for website integration by institutions in Ireland [14].

In terms of the general availability of sheet music in the Sibelius format; Score Exchange is a website which allows Sibelius users to upload and sell their scores. It therefore acts as a *de facto* online retailer of sheet music available in the format and content can be previewed via the Scorch web browser plugin [15]. Great Scores is another site which allows the purchase and downloading of sheet music and it also incorporates previews using the Scorch plugin [16]. The Choral Public Domain Library has over 23,000 choral and vocal public domain scores available. An increasing number of these are available directly in MusicXML format, while many others are available in various source file formats (Finale, Sibelius, capella, Myriad, etc.), all of which could also be exported to MusicXML files [17]. Visaudio Designs provides designs for marching bands and percussion ensembles. The shows they produce include editable notation files in both MusicXML and Sibelius formats [18]. Some of the scores available on the Acadia Early Music Archive are available in the Sibelius format [19].

2.3 Software Support

2.3.1 Rendering Software Support

An overall impression of software support for rendering the format with reference to: typical desktop software; and current support on British Library reading room PCs

Due to its proprietary nature `.sib` files cannot easily be opened without the Sibelius software and cannot be played, viewed or printed without it [20].

The most up to date versions of Sibelius should be able to open files from previous versions. The Avid Knowledge Base notes that "there are so many new features in each major version of Sibelius that it is necessary to change the file format" [21]. Sibelius users wishing to share files with those using older versions of the software are advised to export files to an earlier format, although the knowledge base acknowledges that the scores may not look precisely the same.

Scorch is the web browser plugin which allows you to view or print the music score and also playback the music itself on the Internet via computer [22] [23] or as an app for the iPad [24]. It can also be used on musician and music publishers' web sites [4] for previewing items.

In 2016, Scorch was replaced by Sibelius | Cloud Publishing which does not require a web browser plugin to use [25]. It allows individual users to utilise the API to create interactive HTML5 views of the scores in PDF, SCO, SIB and MusicXML formats [26]. This appears to be mainly aimed at music publishers to allow them to sell scores online. It can be seen in operation on the Sheet Music Direct website [27].

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Issues

As stated above .sib files cannot be used without the Sibelius software and unsurprisingly therefore cannot be opened in generic eBook viewers like calibre.

2.3.2 Preservation Software Support

An impression of the availability and effectiveness of software for managing and preserving instances of the file format

Format identification

Sibelius files are identified by the extension .sib. Sibelius is listed on PRONOM (fmt/696) [2] and when tested is therefore identified correctly by Siegfried [28] and FIDO (Format Identification for Digital Object) [29]. TrID file identifier software correctly identifies the Sibelius format [30]. Xena [31] and Apache Tika [32] don't appear to be able to identify the files.

Validation and Detecting Preservation Risks

The Sibelius software has an XML validator and will indicate the kind of error (invalid XML, syntax errors) [33]. JHOVE offers no validation for Sibelius files.

Metadata Extraction

Many fields can be entered for scores within the Score Info functionality within Sibelius software (title, subtitle, composer, arranger, artist, copyright, part name, instrument changes, lyricist, copyist, publisher, dedication, opus number, composer dates, year of composition, etc.) but as mentioned before this is part of the proprietary nature of the program and can only be extracted if migrated to another format (and then may not complete all fields [34]).

Migration

Sibelius allows the import of other file types (Finale, Allegro & PrintMusic, MusicXML, SCORE, MIDI files, PhotoScore .opt and ASCII tablature files) [35]. Sibelius also comes pre-installed with a program called PhotoScore Lite to import PDF files [36].

Current versions of the software can also be used to export in various other formats. For example, the current full program (Sibelius Ultimate.2019) enables export to, e.g.: MusicXML (since version 7 [4]), PDF, TIFF, SVG, etc. for scores, WAV, AIFF, and MP3 (since version 8.2 [37]) for audio recordings, and MIDI [38]. The program can also output to Avid's Scorch sheet music app. Import and export functionality is very limited in Sibelius First, while the options in Sibelius and Sibelius Ultimate differ.

You can migrate Sibelius to Finale by converting to XML [39]. If converted to MIDI format, the file will lose any of the formatting, text lyrics or any other musical expressions or articulations that were in the Sibelius score [40]. Plugins for Sibelius have been developed [41] to allow conversion to the Lilypond file format for music engraving to produce high quality sheet music [42].

The license agreement for the software forbids user to reverse engineer or convert the format [26].

2.4 Documentation and Guidance

An indication of the availability of practical documentation or guidance with specific reference to the facilitation of any recommended actions

No documentation of the .sib file structure exists [26].

2.5 Complexity

An impression of the complexity of the format with respect to the impact this is likely to have on the British Library managing or working with content in this format. What level of expertise in the format is required to have confidence in management and preservation?

As stated above a lot of the data and structure for the Sibelius format comes from the software itself.

To quote Joe Pearson, a product designer for Sibelius:

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“If we were to provide the Sibelius file format to anyone, it wouldn't suddenly be possible to draw a score. You need the intelligence and institutional knowledge of music notation that is the Sibelius codebase in order to make sense of it. In other words - .sib isn't like a .jpg file, which can be thought of as a static representation of an image (sort of!). A lot of the "metadata" that one may want from a score isn't stored in the .sib directly; it's all calculated by Sibelius itself [26]”

2.6 Embedded or Attached Content

The potential for embedding or attaching files of similar or different formats, and the likely implications of this

As outlined above, associated content such as the audio content can be made available, but this is part of the Sibelius software and is not embedded in the format itself.

2.7 External Dependencies

An indication of the possibility of content external to an instance of the file format that is complimentary or even essential to the intellectual content of the instance

None known other than the availability of the software or versions of the software itself.

2.8 Legal Issues

Legal impediments to the use, management or preservation of instances of the file format

Being a proprietary format, there is a license agreement. This agreement expressly forbids user to reverse engineer or convert the format [26].

2.9 Technical Protection Mechanisms

Encryption, Digital Rights Management and any other technical mechanisms that might restrict usage, management or preservation of instances of the file format

Sibelius is a heavily-proprietary format. Other similar scorewriter or sheet music products are not legally allowed to ingest or manipulate .sib files. Users are completely dependent on having a version of the Sibelius software available to render the files.

2.10 Other Preservation Risks

Other evidence based preservation risks, noting that many known preservation risks are format specific and do not easily fit under any of the sustainability factors above

None known.

2.11 Preservation Risk Summary

A summary of preservation risks and recommended actions (where possible).

The evidence discussed throughout this report highlights the proprietary and highly-dependent nature of the Sibelius format.

The main issues include:

- Software dependence
 - Complete dependence on availability of the Sibelius software
 - Proprietary product and format
 - Licensing prevents migration, although the software itself can be used to export in other formats
- Market status
 - The UK office closed in 2012, but the software still has a large user base and is regularly updated

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- Currently viewed as the market leader for scorewriting programs, but there is no clear guidance from other memory institutions on collection and policy
- Documentation
 - No documentation available
- Validation
 - Lack of tools available to validate or check conformance
 - Preservation risks unclear due to lack of standards to benchmark against
- Migration
 - Software allows migration (export) to other formats, but this functionality is dependent on the availability of the software itself

3. Recommendations for Action

Recommended actions in usage and handling of the format. Recommend actions in the support or development of software applications that provide, or have the potential to provide, significant risk mitigation for the format. Note that these recommendations do not take into account other requirements such as those driven by specific British Library collections, or non-preservation issues such as resourcing.

The main recommendations that could be made will be dependent on whether (at least for the short term) the Sibelius software would be made available for accessing any deposited Sibelius content. The availability of the restricted-functionality (but freely-downloadable) Sibelius First may provide an opportunity to test whether that version might provide a suitable platform to render read-only versions of Sibelius files.

Handling Recommendations

The submission of Sibelius files for ingest would suggest that .sib files would represent the master archival copy, while additional delivery files (perhaps in PDF or MP3) could be generated to support access (unless organisations were in a position to be able to make the Sibelius software itself available). Generating access copies in this way would be dependent on the availability of the Sibelius software.

Thinking beyond PDF and MP3 as access copies, MusicXML is an XML-based standard for music notation which can be generated by the Sibelius software [43]. Converting and storing Sibelius source files additionally in MusicXML format might help to maintain platform-independence and increase the chances of the file being renderable by future notation software applications [44]. As with generating other formats, this approach would be dependent on the availability of appropriate versions of the Sibelius software (in this case, versions from Sibelius 7).

Software Recommendations

It would be useful to investigate how the Sibelius software could be made available for rendering .sib files in a reading room context, e.g. testing the testing of Sibelius First for the rendering of read-only scores generated in earlier versions of the software.

Monitoring Recommendations

As outlined earlier, the closure of the UK office raised concerns about the long term future of the product and format which seem so far to be unfounded and regular updates have allayed these fears. An annual review of how Sibelius sits in the marketplace would be recommended.

In terms of alternate products availability, the closure of the UK office has led to the former developers releasing their own product Dorico in October 2016 [45]. Sibelius also has other commercial rivals, e.g. Finale and others [8], and there are also free programs, such as MuseScore [46] and LilyPond [42].

4. References

1. **ReviverSoft**. .SIB file extension. *ReviverSoft*. [Online] 2017. [Cited: 5 April 2017.] <http://www.reviversoft.com/file-extensions/sib>.

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2. **National Archives.** Sibelius. *PRONOM*. [Online] 11 February 2015. [Cited: 6 April 2017.] <http://www.nationalarchives.gov.uk/PRONOM/fmt/696>.
3. **Avid.** Avid. *Avid*. [Online] 2017. [Cited: 5 April 2017.] <http://www.avid.com/>.
4. **Wikipedia.** Sibelius (Software). *Wikipedia*. [Online] 19 March 2017. [Cited: 5 April 2017.] [https://en.wikipedia.org/wiki/Sibelius_\(software\)](https://en.wikipedia.org/wiki/Sibelius_(software)).
5. **Avid.** *Avid Sibelius*. [Online] [Cited: 13 December 2019.] <https://www.avid.com/sibelius>.
6. **Butler, S.** Sibelius | First -- Avid's free music notation software is now available. *Avid blogs*. [Online] 26 June 2018. [Cited: 13 December 2019.] <http://www.avidblogs.com/sibelius-first-now-available/>.
7. **Rothman, Philip.** Sibelius 8.5.1 update available. *Sibelius Blog*. [Online] 19 January 2017. [Cited: 5 April 2017.] <http://www.sibeliusblog.com/news/sibelius-8-5-1-update-available/>.
8. **AlternativeTo.net.** Alternatives to Sibelius. *AlternativeTo.net*. [Online] March 2017. [Cited: 21 April 2017.] <http://alternativeto.net/software/sibelius/>.
9. **Pennock, Maureen and Day, Michael.** WP1: Collection Profile: Digital Sheet Music. *BL Wiki*. [Online] 30 June 2015. [Cited: 21 April 2017.] https://wiki.bl.uk:8443/download/attachments/143297312/WP1_Collection_Profile_DigitalMusicalScores_v1.pdf?version=1&modificationDate=1443106089950&api=v2.
10. **Library of Congress.** Music XML, Version 3. *Sustainability of Digital Formats*. [Online] 27 February 2017. [Cited: 25 April 2017.] <https://www.loc.gov/preservation/digital/formats/fdd/fdd000358.shtm>.
11. **Mitcham, Jenny.** What have we got in our digital archive? *Digital Archiving at the University of York*. [Online] 13 February 2017. [Cited: 04 July 2017.] <http://digital-archiving.blogspot.co.uk/2017/02/>.
12. **Massey University.** File Formats. *Massey University*. [Online] May 2016. [Cited: 21 April 2017.] <http://mro.massey.ac.nz/page/fileformats>.
13. **Contemporary Music Centre Ireland.** Submitting works to CMC's library. *The Contemporary Music Centre Ireland*. [Online] 2017. [Cited: 6 April 2017.] <https://www.cmc.ie/content/submitting-works-cmc%E2%80%99s-library>.
14. **O'Carroll, Aileen and Webb, Sharon.** Digital Archiving in Ireland. *Digital Repository of Ireland*. [Online] 2012. [Cited: 7 June 2017.] <http://dri.ie/digital-archiving-in-ireland-2012.pdf>.
15. **Score Exchange.** Score Exchange. *Score Exchange*. [Online] 2017. [Cited: 7 April 2017.] <http://www.scoreexchange.com/>.
16. **Great Scores.** About Great Scores. *Great Scores*. [Online] 2017. [Cited: 21 April 2017.] <https://www.greatscores.com/tag/about/index.html>.
17. **Choral Public Domain Library.** ChoralWiki. *Choral Public Domain Library*. [Online] 16 November 2015. [Cited: 7 April 2017.] http://www0.cpdll.org/wiki/index.php/Main_Page.
18. **Visaudio.** Visaudio. *Visaudio*. [Online] 2017. [Cited: 7 April 2017.] <http://www.visaudiodesigns.com/>.
19. **Acadia University.** Acadia Early Music Archive. *Acadia University*. [Online] 21 May 2009. [Cited: 21 April 2017.] <http://www.acadiau.ca/~gcallon/www/archive/ftp.htm>.
20. **Cunningham, Stuart.** Music File Formats and Project XEMO (MSc Multimedia Communications). *Wrexham Glyndwr University*. [Online] 2003. [Cited: 21 April 2017.] https://www.glyndwr.ac.uk/cunninghams/research/SCunningham_MSc.pdf.
21. **Avid.** Sibelius - opening files in earlier versions. *Avid Knowledge Base*. [Online] 24 May 2018. [Cited: 13 December 2019.] http://avid.force.com/pkb/articles/en_US/how_to/en360473.
22. **Sibelius.** Sibelius Scorch. *Sibelius*. [Online] 2016. [Cited: 5 April 2017.] <http://www.sibelius.com/products/scorch/index.html>.
23. **University of California, Berkeley Library.** California Song Book. *University of California, Berkeley Library*. [Online] 2 September 2015. [Cited: 6 April 2017.] http://guides.lib.berkeley.edu/california_song_book.
24. **Itunes.** Avid Scorch. *Itunes*. [Online] 1 December 2016. [Cited: 6 April 2017.] <https://itunes.apple.com/us/app/avid-scorch/id436394592>.
25. **Avid.** Sibelius Scorch plug-in compatibility. *Avid Knowledge Base*. [Online] 2 February 2016. [Cited: 11 April 2017.] http://avid.force.com/pkb/articles/en_US/compatibility/Sibelius-Scorch-plug-in-compatibility.
26. **Pearson, Joe.** Apache Module for .sib files. *Sibelius*. [Online] 07 January 2016. [Cited: 25 April 2017.] <http://www.sibelius.com/cgi-bin/helpcenter/chat/chat.pl?com=thread&start=689054&groupid=3&guest=1>.

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27. **Sheet Music Direct.** Sheet Music Direct. *Sheet Music Direct*. [Online] 11 April 2017. [Cited: 11 April 2017.] <https://www.sheetmusicdirect.com/>.
28. **ITforArchivists.** Siegfried. *ITforArchivists*. [Online] 2017. [Cited: 10 April 2017.] <http://www.itforarchivists.com/siegfried>.
29. **OPF.** FIDO usage guide. *OPF Knowledge Base Wiki*. [Online] 7 October 2013. [Cited: 25 April 2017.] <http://wiki.opf-labs.org/display/KB/FIDO+usage+guide#FIDOUusageguide-PurposeofFIDO>.
30. **Pontello, Marco.** TrID - File Identifier. *Marco Pontello's Home Page*. [Online] 24 April 2017. [Cited: 25 April 2017.] <http://mark0.net/soft-trid-e.html>.
31. **Xena.** Xena. [Online] 31 July 2013. [Cited: 16 June 2015.] <http://xena.sourceforge.net/index.php>.
32. **Apache Software Foundation.** Apache Tika. [Online] 2015. [Cited: 5 May 2015.] <https://tika.apache.org/0.5/formats.html>.
33. **Akmedia.** Sibelius Reference Guide. *Akmedia.digidesign.com*. [Online] 2016. [Cited: 18 April 2017.] http://akmedia.digidesign.com/support/docs/Sibelius_Reference_8.3_90869.pdf.
34. **Avid.** Sib. 7.0: PDF, metadata and file info. *Avid Sibelius Help Center*. [Online] 2016. [Cited: 4 July 2017.] <http://www.sibelius.com/cgi-bin/helpcenter/chat/chat.pl?com=thread&start=589379&groupid=3&guest=1>.
35. —. Avid Knowledge Base. *Avid*. [Online] 2 March 2016. [Cited: 5 April 2017.] http://avid.force.com/pkb/articles/en_US/faq/en359423.
36. **Martin, Avery.** How to Import a PDF Into Sibelius. *Techwalla*. [Online] [Cited: 18 April 2017.] <https://www.techwalla.com/articles/how-to-import-a-pdf-into-sibelius>.
37. **Butler, Sam.** Sibelius 8.2 Now Available—What's New. *Avid Blogs*. [Online] 31 March 2016. [Cited: 4 July 2017.] <http://www.avidblogs.com/sibelius-8-2-now-available-whats-new/>.
38. **Wikipedia.** Comparison of scorewriters. *Wikipedia*. [Online] 20 March 2017. [Cited: 11 April 2017.] https://en.wikipedia.org/wiki/Comparison_of_scorewriters.
39. **FinaleForum.** Sibelius to Finale Conversion. *FinaleForum*. [Online] 19 March 2016. [Cited: 6 April 2017.] <http://www.finaleforum.com/viewtopic.php?f=5&t=14120>.
40. **MakeMusic.** Opening Sibelius files in Finale. *MakeMusic Help Center*. [Online] 12 April 2016. [Cited: 7 June 2017.] <https://makemusic.zendesk.com/hc/en-us/articles/217582558-Opening-Sibelius-files-in-Finale>.
41. **Scramblelovers.** Here's my plugin for Sibelius to convert a Sibelius file to Lilypond. *Scramblelovers*. [Online] [Cited: 10 April 2017.] <http://scramblelovers.com/lilypond/>.
42. **LilyPond.** LilyPond. *LilyPond*. [Online] 9 April 2017. [Cited: 10 April 2017.] <http://lilypond.org/>.
43. **MuseScore.** File formats. *MuseScore*. [Online] 2017. [Cited: 6 April 2017.] <https://musescore.org/en/handbook/file-formats-0>.
44. **Contemporary Music Centre Ireland.** Digital Preservation. *The Contemporary Music Centre Ireland*. [Online] April 2012. [Cited: 6 April 2017.] <https://www.cmc.ie/content/digital-preservation>.
45. **Wikipedia.** Dorico. *Wikipedia*. [Online] 8 March 2017. [Cited: 21 April 2017.] <https://en.wikipedia.org/wiki/Dorico>.
46. **MuseScore.** MuseScore. *MuseScore*. [Online] 27 February 2017. [Cited: 21 April 2017.] <https://musescore.org/>.
47. **Avid.** Sibelius First Reference Guide. *cdns3.gear4music.com*. [Online] February 2012. [Cited: 10 April 2017.] http://cdns3.gear4music.com/media/20/207083/download_207083.pdf.
48. **Sibelius.** How to install plug-ins. *Sibelius*. [Online] 2016. [Cited: 10 April 2017.] <http://www.sibelius.com/download/plugins/index.html?help=install>.
49. **Wikipedia.** Scorewriter. *Wikipedia*. [Online] 14 March 2017. [Cited: 11 April 2017.] <https://en.wikipedia.org/wiki/Scorewriter>.

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