



THE GOVERNMENT
OF THE GRAND DUCHY OF LUXEMBOURG
Information and Press Service

ScreenReaderLB

A Luxembourgish voice for screen readers

Project specifications

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Context & introduction

Everyday an increasing amount of content is made available on the web in Luxembourgish. Unfortunately, this content is less accessible to people with disabilities due to the lack of appropriate assistive technologies.

Users who are blind use a screen reader software to interact with a computer or smartphone. The screen reader can display text via a Braille display and text-to-speech.

Due to the lack of text-to-speech technology in Luxembourgish, users who are blind or who have a severe visual impairment will either read text in Luxembourgish using a German text-to-speech or opt for a version of the same text in another language. Text-to-speech can also be useful for other situations, such as offering assistance to dyslexic people who may find reading difficult.

This technology could also have an impact on the quality of life of users who are blind when it comes to 'language changes', i.e. text passages in Luxembourgish on pages in another language. This happens frequently on public websites in Luxembourg (e.g. [our article on this topic on accessibilite.public.lu](#)).

In this project, the Information and Press Service (SIP) proposes to develop a new speech synthesiser that can be used with several screen readers.

These developments should be open source to enable easy integration with the current screen readers on the market for any citizen, without requiring advanced technical skills or specific hardware.

To protect personal data, the voice synthesiser must be able to operate locally, i.e. directly on the hardware of the user.

Particular attention will be paid to the quality and responsiveness of the solution so that it can be used in the context of interaction with a screen reader and a high speech rate.

The construction of such a speech synthesiser would be based on a text-to-speech model or raw data that would be provided by the Centre for the Luxembourgish Language (Zenter fir d'Lëtzebuerger Sprooch - ZLS) under licensing terms that allow this re-use.

This solution would have to be tested by the target audience, and these tests would make it possible to assess the suitability of the proposed solution for their needs. These tests would be carried out in partnership with the Centre for skills vision development (Centre pour le développement des compétences relatives à la vue - CDV).

Project definition

Target audience

The primary audience is users of screen readers who understand Luxembourgish (blind or with a visual impairment). A secondary audience is users with dyslexia or other difficulties to read in Luxembourgish. These users currently use the “read aloud” features of software like Adobe Reader or Microsoft Edge.

Project execution

Expected deliverables

It is expected, within a period of approximately 8 months (May to December), to complete the development of the following deliverable: a speech synthesizer, which can be used by assistive technologies, its source code and its documentation. This speech synthesiser should be provided with an installer tool and a user documentation explaining how to set it up. The project must be finished and any invoices sent before the end of the calendar year 2025.

Project management

The project management will be done by the economic operator. A steering committee (comité de pilotage) will be put in place for the whole length of the project and will meet at least at the beginning and the end of every phase. A project team for daily coordination will also be put in place. This team will meet more frequently according to the needs of the project and at least once a month.

Acceptance testing

The project should include one phase of user tests, in which the CDV will receive a version of the software to be tested by persons with disabilities. The results of this testing phase should be considered as much as possible in the release of the final version. The test phase will have a duration of two weeks.

Specific test scenarios will be defined based on a list of web pages and documents to be read or interacted with. The users will be able to give their feedback on the software, notably on the quality requirements like the reactivity, ability to understand the content at high speeds, support of acronyms, proper nouns, multilingual context, amongst others.

Project Goal

Work description

Main goal

The main goal of this project is to produce an offline and cross-platform text-to-speech engine which will support the following combinations of OSES and screen readers: Jaws and NVDA on Windows, Talkback on Android, VoiceOver on iOS and MacOS.

Optional goals

If the allowed budget and the chosen technological stack permit it, here are the optional goals which could be integrated into the project:

- Support of other assistive technologies: “read aloud” mode in Acrobat Reader and Microsoft Edge.
- Support multiple speech variants.

Optional goals may be goals added to the scope of the projects after an agreement between the economic operator and the SIP.

Data sources

The provider can use any relevant data source if the conditions for their reuse are met. Some remarkable datasets in this field are the ones from ZLS.

ZLS has produced more extensive linguistic resources which are all available online. These samples encompass individual lemmas (34000) and complete sentences (54000). More than 80 % of lemmas and sentences have corresponding audio recordings. This dataset is described on the national open data portal: [Lëtzebuenger Online Dictionnaire \(LOD\) – Linguistesche Daten](#).

Alternatively, [the corpus of the MaryLux project](#) is also available under an open license.

Technological requirements

On Windows, the proposed synthesiser should be installable on Windows 11 at least. On other OSES, the versions n and n-1 of the OS should be supported. Regarding the compatibility with assistive technologies (ex: NVDA, Jaws), and software (ex: Acrobat Reader, Microsoft Edge) only the compatibility with the latest version is required.

The synthesiser should be packaged in an easy to install way (ex: classic installer or msi, on Windows)

The synthesiser should be usable without any specific hardware.

The project can be based on existing Open source components or projects (see Annex).

Quality requirements

- The speech output must remain understandable at high speech rates (500 words per minute)
- The synthesiser must be reactive and be able to generate speech output compatible with an interactive use (less than 100ms latency on the minimum Windows 11 configuration)
- The synthesiser must be able to run fully locally, without any network access.

Profile of consultants and company

- Communication in either English, French or Luxembourgish.
- Ability to demonstrate at least three years of experience in the fields of machine learning and software engineering.
- Skills in text-2-speech projects or natural languages processing.

Execution

Work Environment

The SIP can provide office space for up to two people for occasional collaboration sessions, but successful applicants are expected to work from their own offices.

Management and milestone meetings can be held online via Microsoft Teams. Update and expert meetings will be held on site.

Procedure

We are in a negotiated procedure. The offer should be a time and materials contract which indicates a maximum number of man-days to work and the price per man-day for the different profiles which will intervene. Only the effectively worked man-days will be invoiced.

The offer should contain:

- the response to the specifications;
- the approach to be followed;
- the reasons for the chosen approach;
- the various stages;
- the various deliverables;
- the CV(s) of the proposed profiles, indicating their background and experience on the subject;

- an estimate of the man-days to be provided, as explained in the paragraph above;
- Meetings should also be scheduled at the beginning of the various phases.

The initial approach presented in the proposal may, however, be corrected, supplemented, or adapted by the client throughout the project, as the needs and scope of the study become clearer.

Only one economic operator will be selected. This economic operator may, if necessary, subcontract part of the assignment. After the selection process, the next step will be to sign the necessary contracts. The kick-off session will mark the start of this project. Regular support and management meetings will help with the progression of the project. Weekly progress will be assessed and provided to management.

The project will finish when the deliverables have been achieved within their timeframe and when the solution is given during a final knowledge transfer session. A final presentation of the results will mark the end of the project.

You can contact the address below, for any questions concerning these specifications as well as for the transmission of the documents constituting the offer, until 21 April 2025 at the latest: accessibilite@sip.etat.lu.

An information meeting via Teams for interested service providers will be held on 23 April 2025 at 14:00 CET. You can register at the following address: accessibilite@sip.etat.lu.

Intellectual property rights

The solution developed is protected by the relevant intellectual property and copyright laws and will remain the exclusive property of the Government of the Grand Duchy of Luxembourg for the duration of the project and beyond.

The code will be published at the end of the project under an open-source licence on a public code repository. The names of the developers who contributed will be mentioned. The license of the project should be compatible with the ones of its dependencies.

All disputes concerning this project shall be governed by Luxembourg law, and the courts of the Grand Duchy of Luxembourg shall have exclusive jurisdiction to hear and settle such disputes.

Knowledge transfer

The economic operator will participate in two events where the results of the project will be presented to all stakeholders.

A final knowledge transfer session, before the end of the project, should enable the consultants to provide the necessary knowledge to use, and understand the solution. This session can be held with all involved parties.

Evaluation

The offer will be evaluated based on the quality of the proposition made regarding the deliverables listed in this document and their provided timelines, but also on the quality of the proposed approach and the level of correspondence of the skills of the proposed profiles to the skills needed for this project and the price.

Annex: existing projects in the field

This project can benefit from existing Open source projects. We mention a few of below.

TTS at ZLS

A TTS model has been developed by ZLS on top of the data mentioned in the “Data sources” section and could serve as a basis of a refined model adapted to the constraints of screen readers. This [Wiki on the ZLS' Github](#) contains in-depth information on the architecture of the model as well as the data behind it.

Notably, as outlined on the [“Dataset” page](#), out of all available audio recordings, a total of 32.000 samples with the male LOD voice were used to train the TTS prototype. If some extra recordings are needed, it should be possible to organise new recordings in the frame of this project. If this voice is reused, it must be transformed, to avoid the voice coming from the source samples being recognizable.

Other notable Open source projects

[RHVoice](#) is an Open source multilingual speech synthesiser which supports multiple platforms and screen reader technologies: NVDA and SAPI5 on Windows, Talkback on Android and iOS / MacOS.

Marco Barnig is a specialist in the Text-to-speech field and in TTS for the Luxembourgish language. He has developed and contributed to several Open source projects which can be interesting for this project:

- [Gruut-lb](#) is a phoneme to grapheme mapping for Luxembourgish.
- [eSpeak-NG](#) includes the support for Luxembourgish and is also available for NVDA.
- [Rhasspy Piper LU TTS](#), [Rhasspy Piper LU TTS Streaming](#) models

The [Rhasspy piper](#) project itself already supports the Luxembourgish language based on Marylux. It should be possible to integrate piper into NVDA via [sonata-nvda](#).