Title	Language Resource Switchboard Use Cases
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1   Glossary

LRS - Language Resource Switchboard, a CLARIN service. Often mentioned as 'Switchboard' for simplicity.

VLO - Virtual Language Observatory, a CLARIN service; can invoke the Switchboard by passing on a link to a resource, together with its media type and language.

VCR - Virtual Collection Registry, a CLARIN service; in the future, it shall be possible to invoke the Switchboard from the VCR as well.

CLARIN Tool Space - Set of tools offered by CLARIN, that can be invoked from the Switchboard.

B2DROP - Nextcloud-based cloud space, can invoke the Switchboard, passing on a shared link pointing to a resource in the cloud space.

Cloud-Based resources - Resources held by the researchers in the cloud space. This includes B2DROP, but also other cloud services that allow users to share their resources via 'shared links' (resolvable URLs that are not password-protected).

UI - User interface

URL - Uniform Resource Locator

2   Scope of this document

This document lists a set of Use Cases to describe foreseen uses of the Language Resource Switchboard and to clarify its role in the CLARIN world of services. Additionally it is meant to support the analysis of requirements and the specification of the Switchboard which will be described in separate documents.

Before the final delivery of the Switchboard, this is intended to be a living document and its contents will be refined based on input collected from other stages of the software development lifecycle.

There is another document, complementary to this one, containing the use cases that were considered but discarded for some reason. It can be found in the appendix.

3   Language Resource Switchboard mission statement

The CLARIN Language Resource Switchboard (LRS) aims at bridging the gap between resources and tools that can process these resources in one way or another. The Switchboard can also be seen as an actionable Virtual Tool Registry. For a given resource, it should identify all tools that can process the resource based on the resource's nature (format) and content (language). Users can then select and invoke the tool of their choosing. By invoking a tool, all relevant information about the resource in question is passed on to the tool, and the tool opens pre-initialised with the information gathered by the

Switchboard. This makes it easy for users not only to identify the right tools to operate their resource, but also to initialize the chosen tool in a straightforward way.

The Switchboard should support resources that users find in the VLO, manage in the VCR, store in their cloud space, or hold locally on their machine.

The Switchboard is not intended to be a tool to process, deposit or visualize resources in itself. Its functionality should focus (as much as possible) on its sole purpose: to aid users finding the tools they need for operating the resource(s) they are interested on. Providing a tool discovery service extended by functionality to create a seamless bridge between resource discovery and processing tools.

4 LRS Use Cases

4.1 LRS-UC1 - Identify a tool to process one or more resources, found via an external web application. Including the VLO, the VCR, or a cloud storage service.

4.1.1 Description
The researcher has access to one or more linguistic resources, via a CLARIN resource discovery application (VLO or VCR) or via a cloud service and wants to process it in some way or another.

4.1.2 Goal
Help users to seamlessly step from resources discovery to resources processing.

4.1.3 Preconditions
- The researcher has access to the calling application (where the resource(s) was found).
- The researcher has access in the calling application to one or more resources to process with the help of the Switchboard.
- The resource(s) can be unequivocally identified e.g. through unique URL(s).
- There is at least one tool registered with the Switchboard that provides support for the execution of some task(s) over the desired resource(s).
- The Switchboard is capable of fetching the intended resource(s) from the specified location(s).
- The tools connected to the switchboard are capable of fetching the intended resource(s) from the switchboard.
- The researcher is currently working with one or more selected resources in the calling application.

4.1.4 Assumptions
- All actions are performed online.
- The Switchboard, the calling application (VLO, VCR, or a cloud service) and the tool chosen to process the resource(s) are all online and functioning normally.
- The researcher has access to the tool which will be used to process the resource(s).
- The calling application is aware of some of the characteristics of resource(s), and can invoke the Switchboard passing accurate resource address(es), and optionally, the media type(s) and language(s).

4.1.5 Frequency

Very high. This is the most common use case for the Switchboard, specially when called from the VLO due to its higher number of users.

4.1.6 Basic course

1. While working in the UI of the calling application, the researcher activates an option to process one or more selected linguistic resources with the Switchboard (e.g. in the VLO, the user clicks on a button called "Process with Language Resource Switchboard", made available in the resource files viewer of a record).
2. The researcher is taken to the user interface of the Switchboard.
3. The Switchboard receives from the calling end, the information about the name(s) of the resources(s), and if available, the respective media type(s) and language(s).
4. The Switchboard tries to infer any potentially missing information about the resource(s), and optionally validates the information received from the calling end.
5. The researcher is given the opportunity to manually complete, correct or modify the information about the resource(s).
6. Based on the media type(s) and language(s) accepted by the researcher, the Switchboard presents a list of tools and web services that can process the resource(s) in one way or another. The tools are ordered in terms of the tasks they are able to perform (e.g. dependency parsing, named entity recognition).
7. The Switchboard offers the possibility to present more information (metadata) about each one of the tools listed, e.g. description, URL and hosting institution.
8. Based on the tools' metadata (or prior knowledge), the researcher selects a tool and starts it.
9. The Switchboard redirects the researcher's browser to the tool's UI (or any other endpoint offered by the tool to process the resource).
10. The chosen tool, parses the information passed by the Switchboard and updates its internal state and UI (if applicable) accordingly. Typically, the tool loads the resource and processes it in one way or another.

4.2 LRS-UC4 - Identify a tool to process one or more resources held locally on a researcher's machine.

4.2.1 Description

The researcher has local access to one or more linguistic resources (hence access was not obtained via any external web application) and wants to process it in some way or another.

4.2.2 Goal

Provide a method to use the Switchboard with offline local resources as well as without previous operational knowledge of any CLARIN or cloud storage services.

4.2.3 Preconditions

- The researcher has local access to one or more resources which she intends to process with the help of the Switchboard.
- There is at least one tool registered with the Switchboard that provides support for the execution of some tasks over the selected resource(s).
- The selected resource(s) can be successfully uploaded by the researcher to the Switchboard and used by the selected tool.

4.2.4 Assumptions

- All actions are performed online.
- The Switchboard and the tool chosen to process the resource(s) are online and functioning normally.
- The researcher has access to the tool which will be used to process the resource(s).

4.2.5 Frequency

High. Researchers will want to use the Switchboard functionality directly with resources stored in their private local domain (i.e. on their personal computers, or mobile devices). Researchers may also execute this use case when the connection from the external web applications to the Switchboard does not work for whatever reason.
Together with LRS-UC1, this is the most common use case for the Switchboard.

4.2.6 Basic course

1. The researcher directly accesses the Switchboard through its URL.
2. The researcher uploads the resource(s) and waits for completion.
3. This use case proceeds as in LRS-UC1 (except for steps: 1, 2 and 3).

4.3 LRS-UC5 - Identify a tool to process one or more resources held remotely on a generic online location.

4.3.1 Description

The researcher has online access to one or more linguistic resource(s) (hence access was not obtained via any integrated web application) and wants to process it with the help of the Switchboard.

4.3.2 Goal

Provide a method to use the Switchboard with generic online resources and without previous operational knowledge of any CLARIN or cloud storage services.

4.3.3 Preconditions

- The researcher has online access to one or more resources which she intends to process with the help of the Switchboard.
- The intended resource(s) can be unequivocally addressed e.g. through unique URL(s).
- There is at least one tool registered with the Switchboard that provides support for the execution of some tasks over the desired resource(s).
- The Switchboard and the chosen tool are capable of fetching the intended resource(s) from the specified location(s).

4.3.4 Assumptions

- All actions are performed online.
- The Switchboard, the server which hosts the resource(s) and the tool chosen to process it, are online and functioning normally.
- The researcher has access to the application which will be used to process the intended resource.

4.3.5 Frequency

Medium to high. Researchers will want to use the Switchboard functionality directly with publicly available online resources.

4.3.6 Basic course
1. The researcher directly accesses the Switchboard through its URL.
2. The researcher inserts the URL of the online resource(s) into the UI of the Switchboard.
3. This use case proceeds as in LRS-UC1 (except for steps: 1, 2 and 3).

4.4 LRS-UC10 - Identify a tool to process a sample resource supplied via direct input.

4.4.1 Description
The researcher (or a presenter demonstrating the Switchboard functionality) would like to quickly identify a processing tool by directly inputting some sample resource into the Switchboard, e.g. typing text into a text input box or speaking to a microphone after activating an audio capture option.

4.4.2 Goals
Provide a method for researchers to quickly identify a tool to process a resource or resource type, without the need to search elsewhere for a sample. This can be done e.g. to verify which tools would be available to process resources of a certain language.
Allow for direct input of resource samples, e.g. type text or capture microphone audio directly from the user interface of the Switchboard.
Facilitate the demonstration of the Switchboard functionality by reducing noise and helping to increase engagement during workshops, demonstrations and tutorials.

4.4.3 Preconditions
- There is at least one tool registered with the Switchboard that provides support for the execution of some tasks over the supplied resource sample.
- The chosen tool is capable of fetching the stored sample file from its location in the Switchboard.

4.4.4 Assumptions
- All actions are performed online.
- The Switchboard and the tool chosen to process the supplied resource sample are online and functioning normally.
- The researcher (or demonstration presenter) has access to the application which will be used to process the supplied resource sample.

4.4.5 Frequency
Medium. Researchers will mainly resort to this use case in order to quickly check the output of the Switchboard before supplying full real resources. Application developers and managers might resort to this use case when demonstrating the functionality of the Switchboard.

4.4.6 Basic course
1. The researcher (or demonstration presenter) directly accesses the Switchboard through its URL.
2. The researcher (or demonstration presenter) defines the sample resource to process e.g. by using a text input box or by speaking to a microphone after instructing the Switchboard to capture audio.
3. The Switchboard stores the supplied sample resource as a file, so that it can later be downloaded by the tool chosen to process it.

4. This use case proceeds as in LRS-UC1 (except for steps: 1, 2 and 3).

4.5   LRS-UC2 - List all available tasks and respective tools.

4.5.1   Description
The researcher wants to explore all possible processing tasks offered by the CLARIN tool space. Here, the Switchboard is used as a single point of access to explore all available tasks that can be executed over each possible resource type, as well as the tools that support those tasks. The Switchboard presents the researcher with a list of tasks further subdivided in lists of tools for each task.

4.5.2   Goal
Provide a single point of access where the researcher can have an overview of the tasks which can be executed by the tools available in the CLARIN space.

4.5.3   Preconditions
- The Switchboard is online and functioning normally.
- There is at least one tool registered with the Switchboard that provides support for the execution of some tasks over one or more resources.

4.5.4   Assumptions
- All actions are performed online.

4.5.5   Frequency
Medium to high. Researchers not yet familiar with the various tasks which can be executed by the tools available in the CLARIN space might resort to this use case. More familiarized users are expected to follow this use case as mnemonic vehicle to assess the tools.

4.5.6   Basic course
1. The researcher directly accesses the Switchboard through its URL.
2. The Switchboard presents the researcher with a list of all possible tasks and the tools available to perform them. Further displaying the mimetypes and languages supported by each tool.
3. The researcher can also explore the tool space in a tool-oriented view, rather than the aforementioned task-oriented view. Here, tools will not be grouped by tasks.
4. The researcher can narrow down the list of tools by selecting a specific media type and/or language e.g. via facets.

4.6   LRS-UC3 - Add, remove or modify an application from the Switchboard tool registry.

4.6.1   Description
The Switchboard operators want to add, remove or modify the metadata of a tool entry in the tool registry, so that the toolspace offered by the Switchboard to researchers is updated. This use case does not concern end-users.

4.6.2   Goal
Provide the Switchboard operators (developers and application managers) with an easy mechanism to add, remove or update the metadata of the tools offered in the toolspace, ideally without downtime.

4.6.3 Preconditions
- The operator has the permission to change the tool registry.

4.6.4 Assumptions
- The Switchboard is online and functioning normally.
- All actions are performed online.
- When removing or modifying a tool entry, there is at least one tool registered in the toolspace of the Switchboard that it can be removed or modified.
- When adding a new tool, the metadata of the tool to be added is fully compatible with the Switchboard's metadata format for tools.

4.6.5 Frequency
Medium to low. It is expected that this use case will happen more often during an initial phase, where many of the CLARIN tools are not yet connected to the Switchboard. Uptake can be slow.

4.6.6 Basic course
1. The administrator logs in to the administration web console of the Switchboard or alternatively, gains access to the Switchboard application files on its host machine.
2. The administrator modifies the Switchboard tool registry, adding, removing or editing the entry for the intended application.
3. The Switchboard validates the new state of its application registry.
4. The Switchboard reflects the (model) change in the list of tools (view) presented to the researcher during the relevant use cases.

4.7 LRS-UC6 - Demonstrate the Switchboard functionality.

4.7.1 Description
A user ('presenter') wants to demonstrate the functionality of the Switchboard to interested parties.

4.7.2 Goal
Allow easy, appealing and low-noise demonstration of the functionalities of the Switchboard.

4.7.3 Preconditions
- The Switchboard is online and functioning normally.
- There is at least one tool registered with the Switchboard that provides support for the execution of some tasks over the selected resource(s).
- The selected resource(s) can be successfully fetched by the Switchboard and the tool(s) selected to process it.

4.7.4 Assumptions
- All actions are performed online.
- The Switchboard and the tools chosen to process the resource are online and functioning normally.
- The presenter has access to the tools which will be used in the demonstration to process the resource(s).

4.7.5 Frequency
High.

4.7.6 Basic course

1. The presenter doing the Switchboard demonstration will follow: LRS-UC4, LRS-UC5 or LRS-UC10 (or occasionally: LRS-UC1 or LRS-UC2). The resource for the demonstration can be supplied by directly uploading the resource to the Switchboard (LRS-UC4), by supplying a publicly accessible URL from where the resource can be downloaded (LRS-UC5), or by simply typing a text or speaking to a microphone in the respective input boxes of the Switchboard (LRS-UC10).

4.8 LRS-UC7 - Enable users to provide feedback and report problems.

4.8.1 Description
The Switchboard operators and developers want to collect problem reports regarding the current production version to tackle operational issues and to generate user satisfaction metrics.

4.8.2 Goal
Improve user satisfaction and the quality of the connected services, without affecting functionality or user experience in a disruptive way.

4.8.3 Preconditions
- The Switchboard is online.

4.8.4 Assumptions
- All actions are performed online.

4.8.5 Frequency
Medium.

4.8.6 Basic course

1. The researcher detects a problem or defect while working with the Switchboard.
2. The researcher uses the option to report a problem, made available in the UI of the Switchboard. This option may be always visible in an unobtrusive location of the UI, or displayed to the researcher in a more prominent fashion when the Switchboard detects an error.
3. The Switchboard displays an input box requesting the researcher to describe the problem and offering the additional possibility to attach a file supporting the report.
4. The user fills in the requested information and submits it. Given that the minimal necessary information for the report is provided, the report is submitted to switchboard@clarin.eu

4.9 LRS-UC9 - Test tool availability.

4.9.1 Description
The Switchboard operators and developers want to collect basic status information and statistics about all the tools connected to the Switchboard, their availability, and their performance on standard parameters such as response times (ping).

4.9.2 Goals
Improve satisfaction among Switchboard users.
Improve quality of connected services.
Gain insight on tools' performance and uptime.

4.9.3 Preconditions
- The Switchboard is online and functioning normally.

- There is at least one tool registered with the Switchboard that provides support for the execution of some task(s) over the selected resource(s).

4.9.4 Assumptions
- All actions can be performed online by automated HTTP requests (e.g. CURL).
- Tools may be online or offline, working properly or not.

4.9.5 Frequency
Very high.

4.9.6 Basic course
1. The Switchboard is invoked as described in LRS-UC1, LRS-UC2, LRS-UC4, LRS-UC5 or LRS-UC10.
2. The Switchboard queries each of the applicable tools automatically before listing them to the researcher.
3. The Switchboard verifies each tool's availability and decides on their working status.
4. The Switchboard presents this information in the list of applicable tools provided to the researcher and stores it in a dedicated datastore.

4.10 LRS-UC8 - Collect usage information.

4.10.1 Description
The Switchboard operators and developers want to collect anonymous usage information to tackle operational issues and to improve service quality. They will want to, for instance, track how often a user changes the detected mediatype to infer meaningful information about the quality of the mediatype detection system.
Information collection works behind the scenes without active user involvement (and is hence complimentary to LRS-UC1, LRS-UC2, LRS-UC4, LRS-UC5 and LRS-UC10). This use case does not concern end-users.

4.10.2 Goals
Improve satisfaction among Switchboard users by refining its interface and functionality, based on real life usage data.
Gain insight on tools' popularity.

4.10.3 Preconditions
- The Switchboard is online and functioning normally.

4.10.4 Assumptions
- All actions are performed online.
- There is at least one tool registered with the Switchboard that provides support for the execution of some task(s) over selected resource(s).

4.10.5 Frequency
Very high. Collection of usage information should happen every time a user interacts with the Switchboard.

4.10.6 Basic course
1. The researcher makes use of the Switchboard in any of the user-oriented cases described by LRS-UC1, LRS-UC2, LRS-UC4, LRS-UC5 and LRS-UC10.
2. Each user action is being tracked: the switchboard invocation URL (where it was invoked from), the actions performed in the user interface (e.g. changing the resource characteristics) and which tools or web services are called (the outgoing URL invocations).

3. The anonymous usage information is stored and later used to generate statistics and usage patterns.
4. This data can then be used to improve service quality by the developers and operators of both the Switchboard and the tools in the CLARIN tools-space.

5   Appendix: discarded use cases

5.1   LRS-PUC1 - Have switchboard collect rudimentary provenance information.

5.1.1   Description
When researchers make use of the switchboard to invoke tools, they might download the results of a tool's analysis for the record. Often they find that tools do not attach provenance information on the analysis results. Of course, it'd be desirable to have tool developers take care of the issue, but many developers do not. The switchboard has metadata about each tool in its tool space. This metadata could be used a provenance replacement, so researchers could get it from the switchboard and attach it to the analysis results of the given tool.

5.1.2   Goal
Support researcher(s) with annotating tool results with tool provenance data. This concerns LRS-UC1, LRS-UC4, and LRS-UC5.

5.1.3   Preconditions
- The preconditions for LRS-UC1, LRS-UC4, and LRS-UC5 hold, respectively.
- The LRS has minimal metadata to compile accurate provenance information. And this metadata can be trusted (that is, reflects tool characteristics such as version number, platform, etc.) .

5.1.4   Assumptions
- see assumptions for LRS-UC1, LRS-UC4, and LRS-UC5, respectively.
- tools permit users to download results
- switchboard can compile provenance metadata from invocation.

5.1.5   Frequency
High. In a ideal world, the tools themselves need to attach provenance data to their analysis results. But since the switchboard has information about the tools, some rudimentary provenance metadata could be supplied for each tool invocation.

5.1.6   Basic course
- The researcher invokes the switchboard following LRS-UC1, LRS-UC4, or LRS-UC5.
- The researcher is directed to the tool's webpage and starts the analysis (or is presented with the results of the selected web service)
- The LRS prepares an invocation protocol for the user to inspect and use.
- The researcher collects analysis results (from the tool's tab), and connects it manually with the invocation protocol, then stores the combination (manually).

Note: given the switchboard design rationale, the switchboard nor the called tools can support the automatic storage of processing results (other than making the results available for download).

5.2   LRS-PUC2 - Test tool's performance and working status

5.2.1   Description
The Switchboard operators and developers want to collect status information and statistics about all the tools connected to the Switchboard, their performance and working status on well-chosen test scenarios.

5.2.2 Goal
Improve satisfaction among switchboard users; improve quality of connected services; gain insight on tools' performance and uptime

5.2.3 Preconditions
- The Switchboard is online and functioning normally.
- There is at least one tool already registered with the Switchboard, that provides support for the execution of some task(s) over selected resource(s).

5.2.4 Assumptions
- All actions can be performed online by automated HTTP requests (e.g. CURL).
- Tools may be online or offline, working properly or not.

5.2.5 Frequency
Medium to High.

5.2.6 Basic course (for a single test case, there will be many others)
- The Switchboard is invoked as described in LRS-UC1, LRS-UC2, LRS-UC4, LRS-UC5 or LRS-UC10.
- The switchboard invokes each of the applicable tools automatically before listing them to the researcher.
- The switchboard verifies each tool's availability, validates its working status and measures its performance parameters, by running some well defined automated test(s).
- The switchboard presents this information in the list of applicable tools provided to the researcher and stores it in a dedicated datastore.

Note: some tools automatically start their processing once invoked. Other tools require users to press a RUN button, potentially after other tool configuration options were selected.