Deliverable D2.4

API Specification

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Executive Summary

This document describes the first version of the Audio Commons API specification. The Audio Commons API is the component that allows interoperability among the different services and tools within the Audio Commons Ecosystem. Communication between services is carried out through HTTP requests, and the Audio Commons API follows the RESTful API principles.

The current API Specification is functional and has already been implemented in the Audio Commons Mediator (see Deliverable D2.5: Service Integration Technologies). It specifies the HTTP interface for the most basic services of the Audio Commons Ecosystem: Search, Download, Licensing and Service Discovery.

Future iterations of the API specification will be published as long as new and updated types of services are added and implemented in the Audio Commons Mediator. This document also includes an estimation of future services and API endpoints that will be included during the lifetime of the AudioCommons project.

This API specification can also be found online in the form of API documentation here: https://m.audiocommons.org/docs/api.html

This deliverable is complementary to deliverables D2.5 and D2.6, which describe the technologies developed for service integration (the Audio Commons Mediator) and present draft guidelines for adding new services to the Audio Commons Ecosystem (respectively).

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1 Summary of the API specification

The Audio Commons API specification is divided into three main sections which describe:

1. The overall functioning of the API
2. How to authenticate requests
3. The existing endpoints and their supported parameters

What follows here is a brief summary of the contents of each part of the specification. The official API specification is published online as part of the documentation of the Audio Commons Mediator and can be accessed here: https://m.audiocommons.org/docs/api.html. We refer the reader to that document for the actual specification details which are not included in this document. This document is **only expected to be a complement** to the actual specification which is hosted at the aforementioned URL (or clearly referenced in the AudioCommons website, http://audiocommons.org).

1.1 Overview

The overview section of the specification explains the overall functioning of the API in terms of how should requests be made, how are responses returned and how are errors reported.

The essential idea behind the Audio Commons API is that once a request is received from an application, the Audio Commons Mediator talks with the (possibly many) services connected to the ecosystem and forwards their responses to the application. Therefore, one request from an application to an Audio Commons API endpoint, might trigger requests from the mediator to N third party services. All these potential requests are handled asynchronously in a way that the application does not need to wait until responses from all third-party services are received in the mediator to continue its execution.

When a request is received, the mediator analyses it and forwards the request to the different third party services that can provide an answer for it. Immediately after forwarding the request (and before obtaining any response from the services), the mediator returns what we call an **aggregated response** dictionary to the application that made the original request. This aggregated response includes, among others, the URL that should be followed to retrieve individual responses returned by the third party services. The application that sent the original request is therefore responsible for iteratively pulling the aggregated response contents, which will be updated as soon as new responses are received from the queried third party services.

1.2 Authentication

Requests made to the Audio Commons API are authenticated using OAuth2[1] authentication flows. This means that Audio Commons end users need to be authenticated when using applications that use the Audio Commons API. This effectively turns out in a requirement that any application using the Audio Commons API will need to implement a way through which users can authenticate with their Audio Commons accounts (i.e. showing a user and password form (for trusted applications only) or redirecting users to Audio Commons Mediator website via a standard “login with” flow).

[1] https://oauth.net/2/

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Nevertheless, there are some situations in which the third party services will require the authentication of an end user in order to respond to the request. For example, if a resource needs to be uploaded to a third party service, such resource probably needs to be linked to an individual user account and therefore the upload request to the third party service must be authenticated to act on behalf of a user account from the service. To solve that problem, the Audio Commons Mediator offers a way through which Audio Commons users can link their Audio Commons accounts with their 3rd party services user accounts (e.g. link Audio Commons account with Freesound account). When two accounts are linked, the Audio Commons Mediator will be able to perform requests to the third party services whose accounts are linked and authenticate the end users.

1.3 API Endpoints

As mentioned above, the current API specification defines the most essential endpoints that allow the interconnection of the most essential services in the Audio Commons Ecosystem. This API endpoints include:

- **Collect response endpoint (/api/v1/collect/)**: this endpoint returns the contents of an aggregated response given an aggregated response id. As mentioned before, right after an application has made a request to the mediator, it is given a URL where the application can collect the results of the request. These results are updated as soon as new responses from third party services are received in the mediator. This is the endpoint that's used to get updated responses. In addition to the individual responses from each third party service, this endpoint returns statistics about how many responses have been received and how many were expected.

- **Service discovery endpoint (/api/v1/services/)**: This endpoint returns information about all third party services available in the Audio Commons Ecosystem. For each service, a list of components is provided informing of what parts of the Audio Commons API are supported. This endpoint is therefore used to answer questions such as "which content providers are available for searching?", or "what audio fields from the Audio Commons ontology are supported in service X search results?".

- **Text search endpoint (/api/v1/search/text/)**: This endpoint allows to perform textual queries in third party content providers. It takes an input parameter where the textual query is specified (e.g. "dogs") plus a number of other optional query parameters to define other query aspects such as which metadata fields are to be returned or the sorting of results. The current implementation and definition of this endpoint does not allow filtering of results, which is planned for future updates.

- **Download endpoint (/api/v1/download/)**: This endpoint takes as input an Audio Commons Unique Identifier (i.e. id that uniquely identifies one audio resource in the Audio Commons Ecosystem) and requests a download link to the service that hosts the corresponding resource. The download URL returned by this endpoint is a URL that the application can use to download the requested resource directly from the content provider without any need for further authentication. This is an interesting special case in which the **application will talk directly to the third party service** (after first talking with the mediator). It is designed in this way because audio content should be directly served to the application instead of passing through the mediator.

- **Licensing endpoint (/api/v1/license/)**: This endpoint takes as input an Audio Commons Unique Identifier (acid) and checks the different AC services that implement the licensing components to see whether they can provide an URL where the resource can be licensed. If it

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finds one service that provides licensing for the required audio resource, it returns the URL where a user could be redirected to acquire a license for that content.

2 Expected evolution of the API

In this document we have showed the Audio Commons API specification in its current state, with interfaces for the most basic services of the ecosystem defined and already implemented. As the AudioCommons project continues evolving, new and updated types of services will be included in the ecosystem and the API specification will consequently be also updated. Feedback gathering from tool developers and users testing the Audio Commons Ecosystem prototype will also be relevant for future updates of the API specification.

The most significant expected additions to the Audio Commons API in the short term include:

- **JSON-LD format for responses**: One of the most significant short-term planned updates is the adaptation of the API responses to a linked-data compatible format such as JSON-LD. This will allow easier interoperability with applications using semantic technologies while keep compatibility with usual JSON-based API clients.
- **Filtering capabilities in text search endpoint**: Current specification of text search does not allow to filter search results by specific metadata properties. A future update on that part of the API will enable such filtering.

Longer-term additions to the API specification will potentially include:

- **Similarity search endpoint**: API endpoint to return similar resources to a given audio resource of the Audio Commons Ecosystem.
- **Upload endpoint**: API endpoint to upload audio content to one of the Audio Commons content providers.
- **Audio analysis endpoint**: API endpoint to perform analysis to an uploaded file and return annotations as generated by the Audio Commons audio analysis tools (see Deliverables 4.2, 4.3 and 5.2).
- **License calculator endpoint**: API endpoint that given a listing of CC licenses used in a specific audio composition it tells with which licenses and with which limitations the result can be published.

The decisions about which features to add to the API specification and which aspects to improve will be taken according to received feedback after internal evaluations with members of the consortium and potentially external testers.

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