

INTEROPERABILITY BETWEEN AI4EU EXPERIMENTS AND THE FRAUNHOFER MINING PLATFORM

Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS

Dr. Jens Fisseler, AI4Media Workshop on the European AI-on-Demand Platform



Sources: PxHere/Pixybay

Agenda

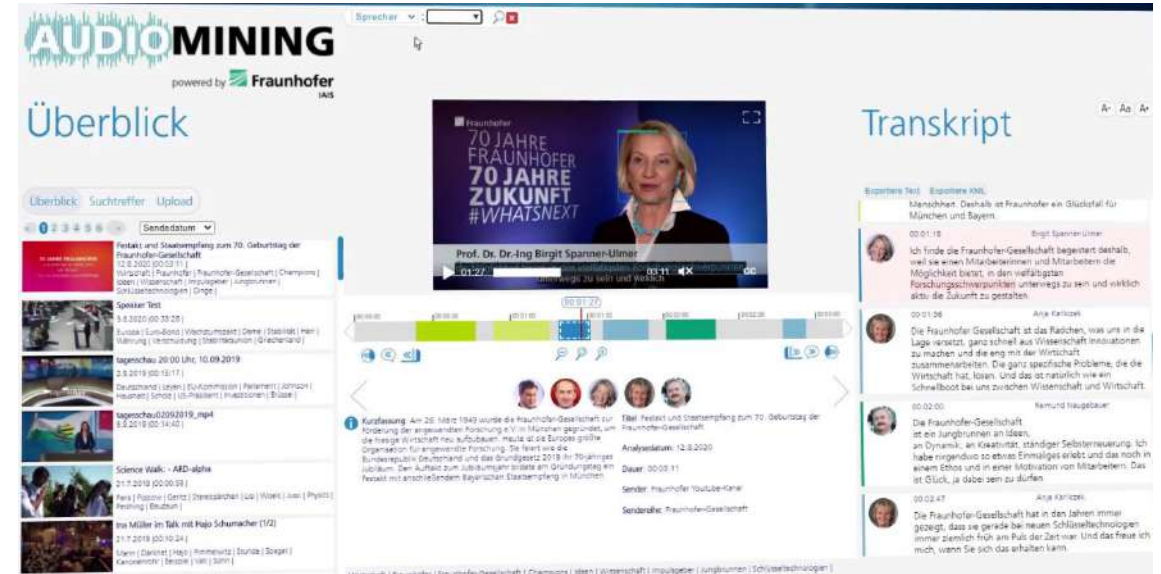
- 01 **Introduction**
- 02 **Use Cases**
- 03 **Technical Description of the Mining Platform and its Services**
- 04 **Interoperability**
- 05 **Conclusion**

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01 Introduction

Project Context

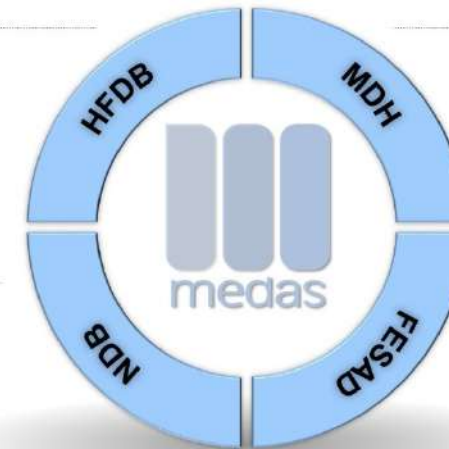
- Fraunhofer IAIS Audio Mining speech recognition system
- Strategic partnership with WDR/ARD in use of artificial intelligence in media
- Participate in development of the Media Data Hub
- Increasing demand for AI-based solutions to automate content analysis for multimedia production processes



Mining Platform automatically extracts insights from media assets at scale

Hörfunkdatenbank
12 nutzende Rundfunkanstalten
Basis Dokumentations- u. Archivprozesse Audio

Normdatenbank
20 Systemanbindungen
Umsetzung u. Sicherung Metadatenstandards- u. -qualität



Media Data Hub
ARD Mining Plattform
ARD Multimediale Suchmaschine
Linked Data.

Fernseharchiv- u. Dokumentations-System
14 nutzende Rundfunkanstalten
Basis Dokumentations- u. Archivprozess für Video

Mining Platform Features

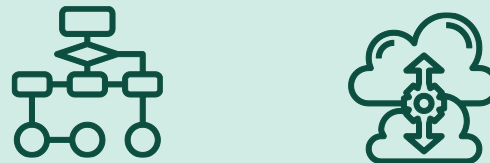
Multimodal, AI-based analysis services

Integrates AI-based services for extracting insights from text, audio, image and video data



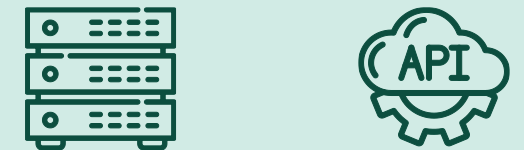
Extensible and Scalable

Workflow-based system allows easy customization and extension, and can be scaled according to need




Easy Integration

Can be deployed on a Kubernetes cluster in the cloud or on-premises, and can be integrated via a REST API



Icons from Flaticon.com

 Fraunhofer

70 JAHRE
FRAUNHOFER
70 JAHRE
ZUKUNFT

Person_Vorgabebbox: (100, 00)



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und das noch in ei
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- Already in productive use, processing 100,000 media assets per day
- Scalable up to 1,000,000 media assets per day on the same hardware
- Ongoing development and improvement both of the Mining Platform as well as of the mining services

The background features a blue gradient with bokeh effects and a pattern of 3D cubes in the upper right corner.

02

Use Cases

ARD/Fraunhofer Mining Platform

Cross-media Search Application

- Part of ARD medas
- Ingested media assets are automatically processed by the Mining Platform
- Comprehensive content analysis with AI-based services
- Extracted metadata immediately available for use in search application

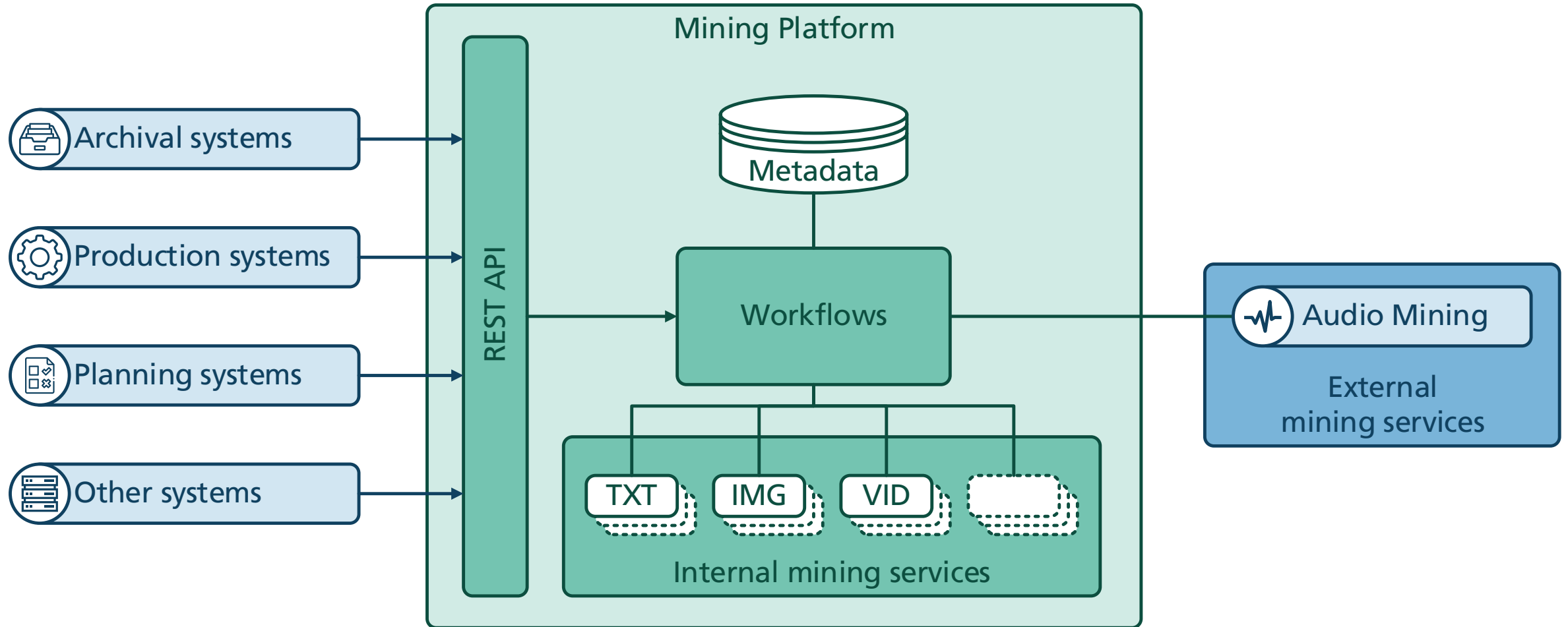
The screenshot displays the ARD Crossmediale Suche BETA interface. At the top, there's a navigation bar with 'Suchergebnisse', 'Sammelboxen', 'Bestellvorgänge', 'FAQ', 'Profil', and settings icons. The main content area features a video player titled 'KI und Gesichtserkennung' with a subtitle 'W wie Wissen | 07.03.2020 | 6:34'. Below the video, a search results list is shown with filters for 'precher' (Specher1-12), 'okaltäten', and 'rganisationen'. The search results include text snippets with highlighted keywords like 'Gesichtserkennung' and 'Videoüberwachung'. On the right side, there are three video thumbnails with titles like 'Abgehört durch Alexa und Co.', 'KI und Gesichtserkennung', and 'KI und ich - Wo entscheidet KI schon heute über...'. The bottom of the interface shows a footer with 'BR DRA DRadio DW HR MDR NDR ORF RB RBB SR SWR WDR' and '1.5.0 Boenisch Release Not'.

Visualization of transcribed speech in the medas multimedia search application

03

Technical Description of the Mining Platform and its Services

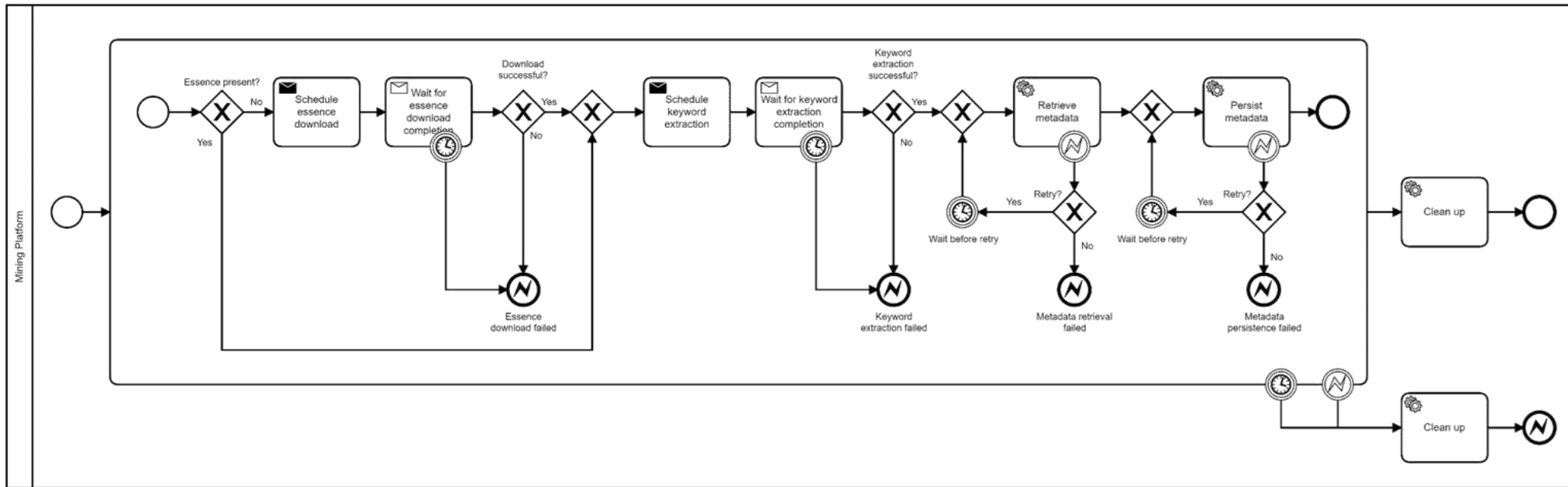
System Architecture and Components



Icons from Flaticon.com

Workflow Orchestration

- ▶ BPMN workflow engine orchestrates processing steps
- ▶ Domain-specific language for workflow modeling
- ▶ Flexible combinations of mining services
 - ▶ Named entity recognition, followed by disambiguation and linking
 - ▶ Speech recognition, followed by text mining
- ▶ Scheduler for resource management and prioritization of tasks



AI-based Mining Services



Text mining services

- › Keyword extraction
- › Named entity recognition
- › Entity disambiguation & linking
- › Tagging
- › Topic modelling



Audio mining services

- › Tried and tested technology
- › LSTM & TDNN
- › Upcoming features
 - › Speaker detection
 - › Language detection
 - › ...



Image & video mining services

- › Face detection and recognition
- › Under development
 - › Object detection
 - › Concept detection
 - › Cut and scene detection

Icons from Flaticon.com

The background features a blue bokeh effect with various sized circles and a cluster of 3D cubes in the upper right corner. The cubes are rendered in shades of blue and white, creating a geometric pattern.

04

Interoperability



Reasons for Interoperability

Don't reinvent the wheel

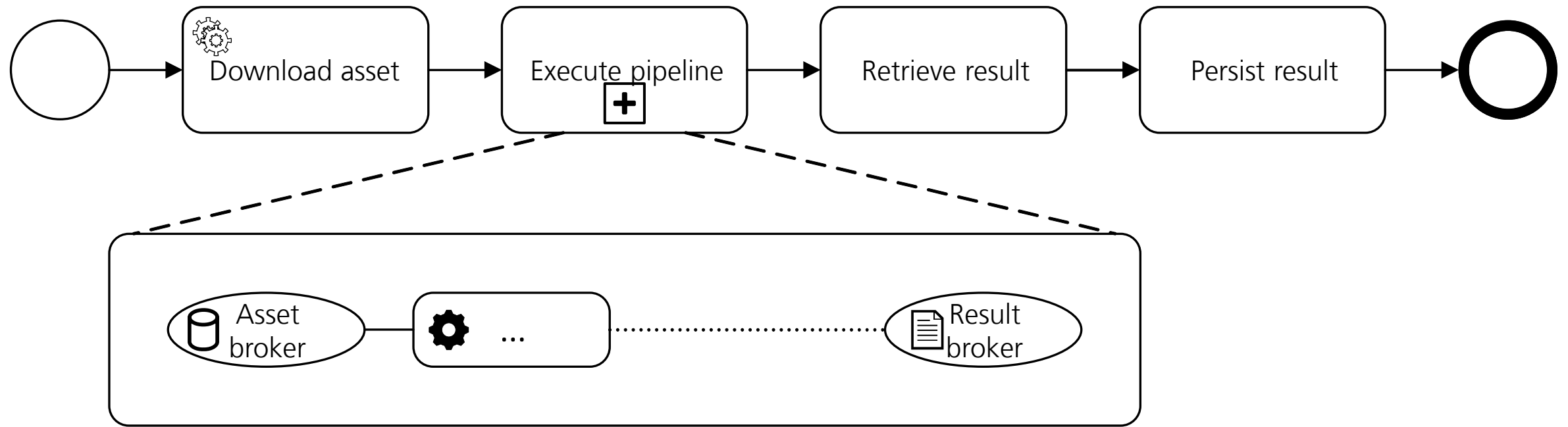
- › Use AI4Experiments pipelines within mining workflows
 - › Quickly integrate new mining services
- › Use mining services in AI4Experiments pipelines
 - › Tried and tested services
 - › Implement training pipelines
- › No free lunch



Interfaces need to be adapted

Adapt AI4Experiments Pipeline to the Mining Platform

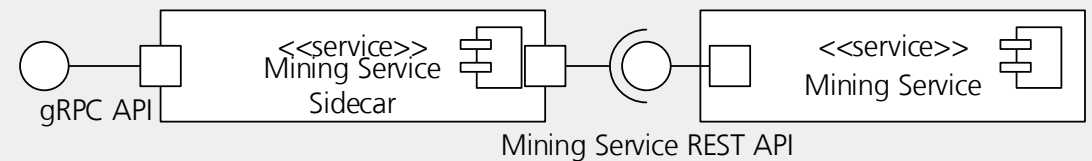
- Execute AI4Experiments pipeline as a mining service
- Convert data between mining workflow and AI4Experiments pipeline



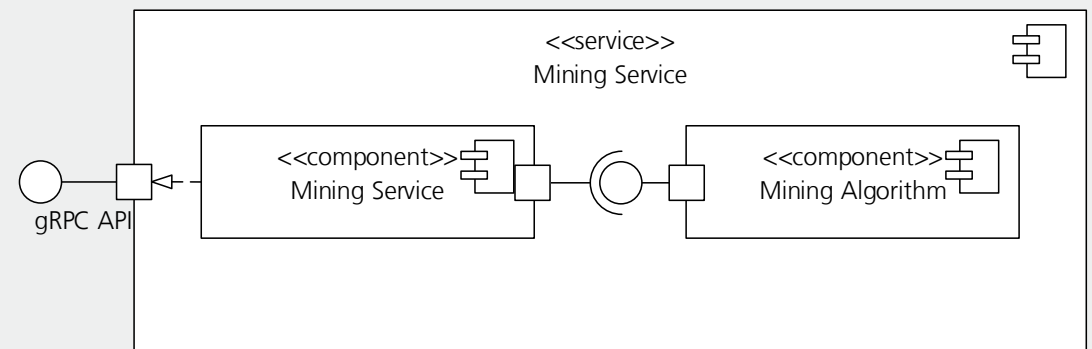
Adapt Mining Services to AI4Experiments

- › Mining services implement REST API
- › AI4Experiments containers use gRPC
- › Alternative approaches
 - Implement reusable sidecar containers for different modalities (text, audio, image, video)
 - Implement AI4Experiments mining service framework

a.



b.



The background features a gradient of blue tones with a bokeh effect of out-of-focus circles. On the right side, there is a cluster of 3D cubes in various shades of blue and white, creating a geometric pattern.

05

Conclusion

Conclusion

- › A lot of potential synergies between Mining Platform and AI4Experiments
- › Technical challenges for integration



Reuse and cooperate to develop AI-based media analysis services and workflows



Source: oatawa/stock.adobe.com

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