



DATA MARKET
AUSTRIA

Data Market Austria



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DMA Coordinator

Studio Director | Research Studio **Data Science**

Research Studios Austria Forschungsgesellschaft mbH

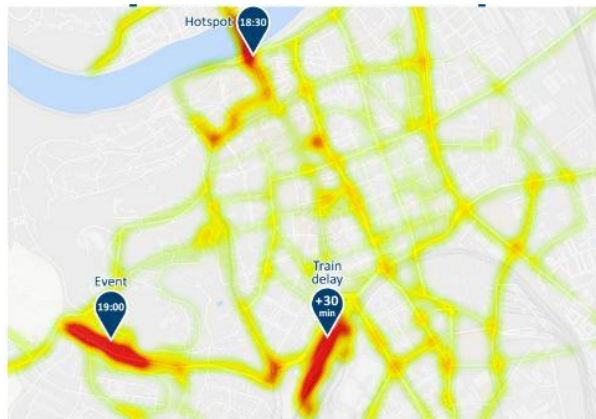
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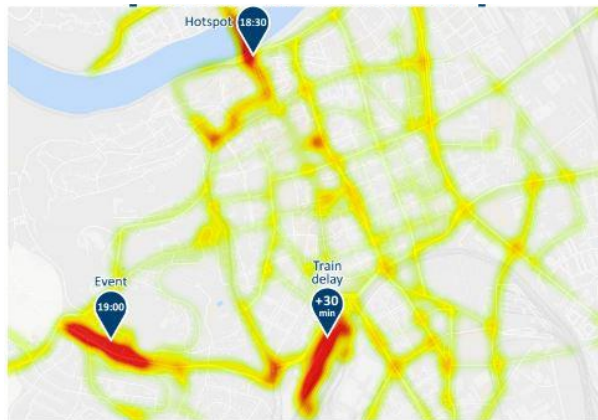
Inhalt

- Motivation and general structure
- Technology
- Pilots
- Community, Sustainability, Legal
- Outlook

motivation



motivation



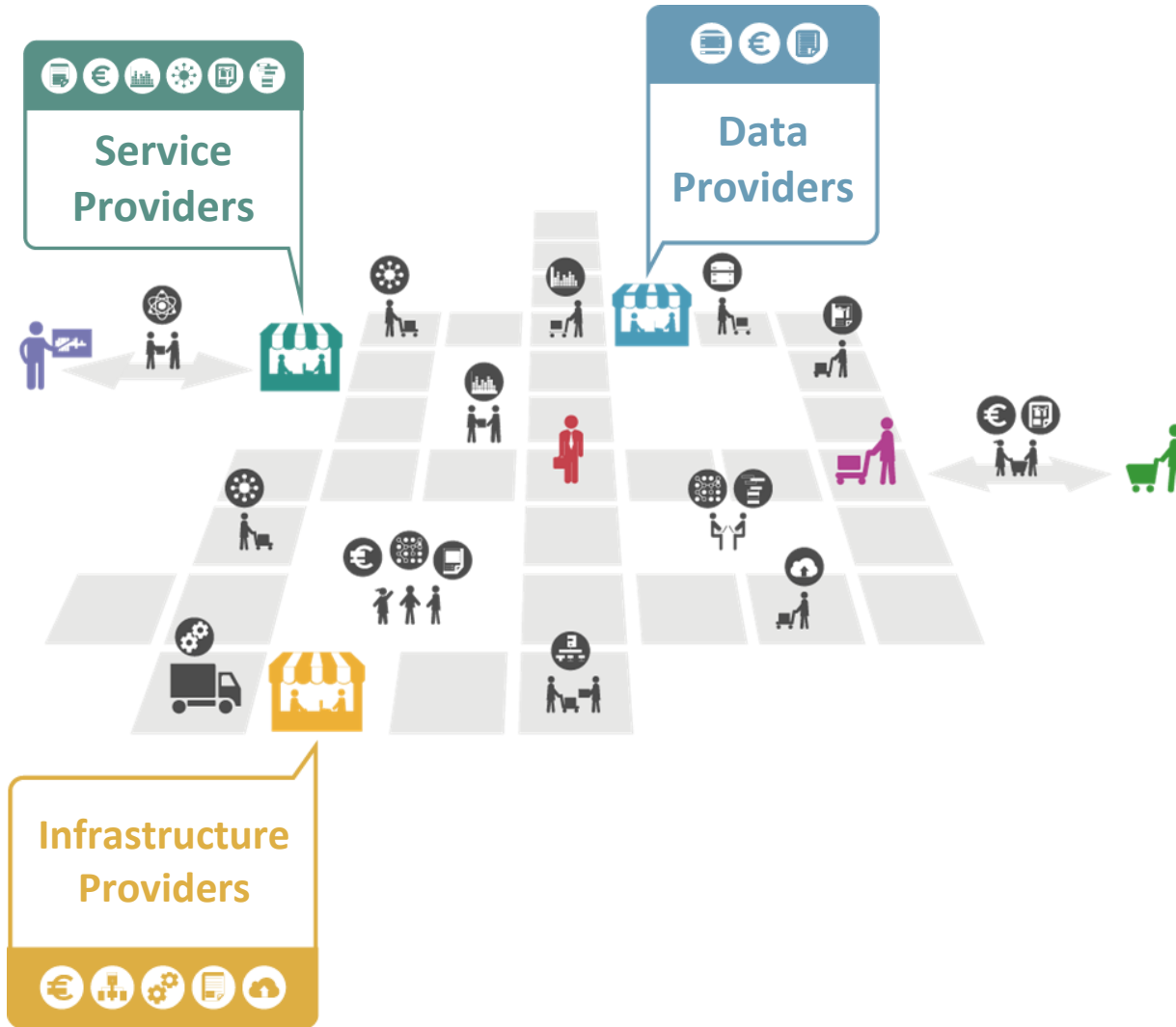
motivation



Struktur



Angebot

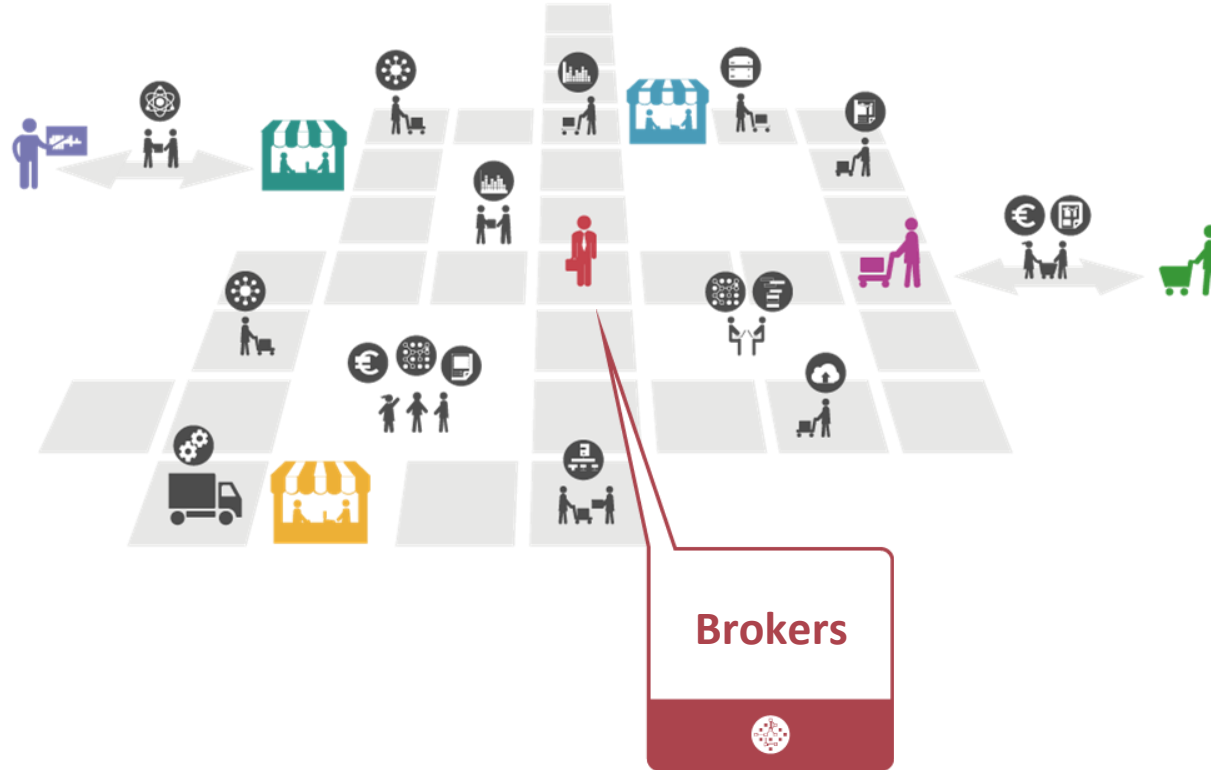


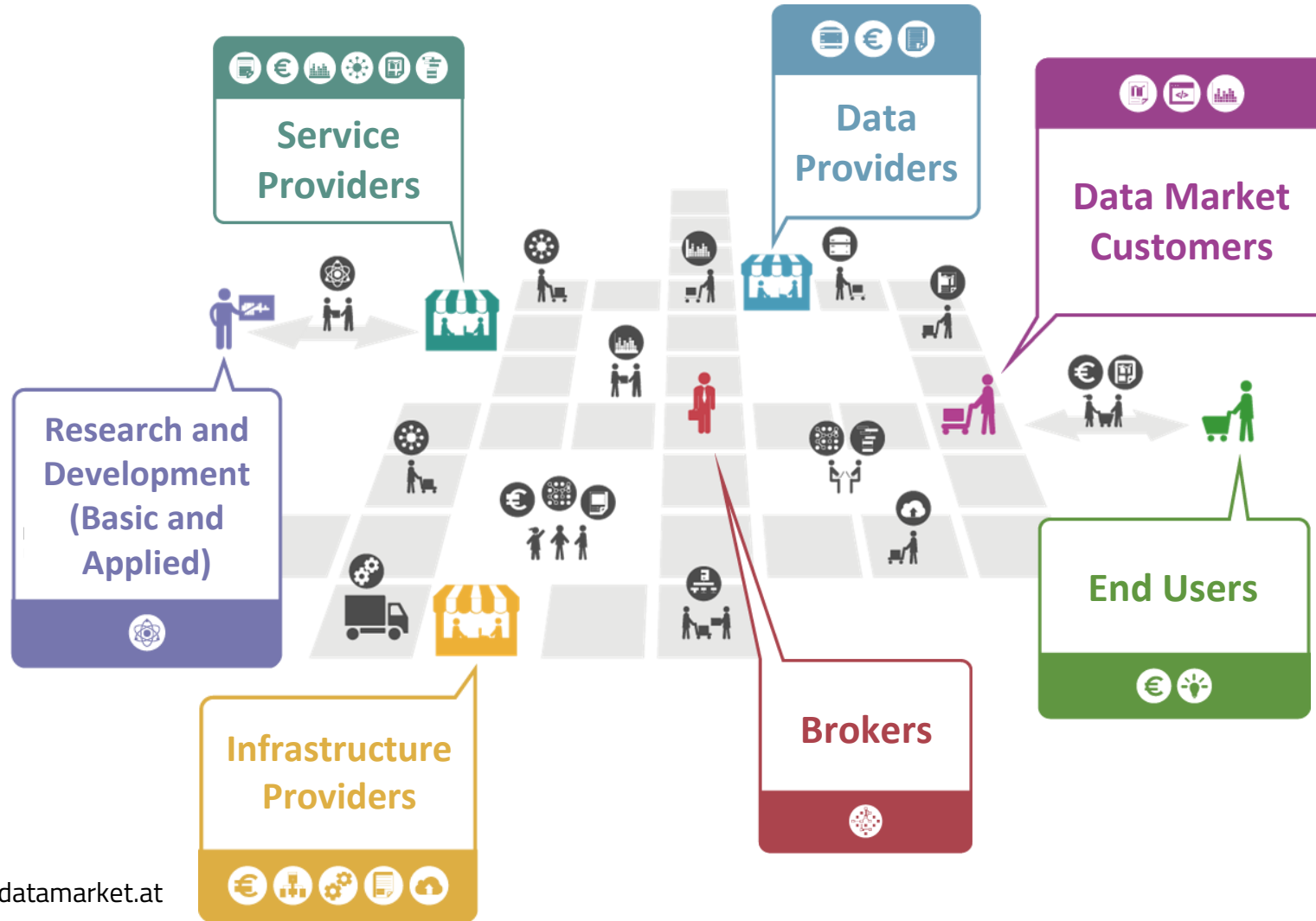




End Users

Makler





Inhalt

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Concept:

an API-based set of tools, allowing each Actor to maintain different levels of control

Data Management



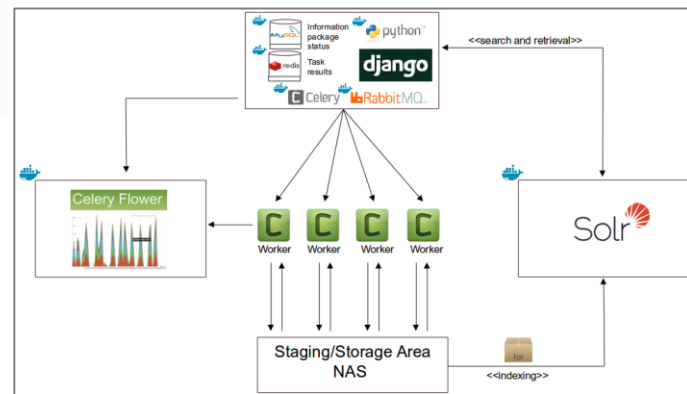
Administration ▾ Submission ▾ Management ▾ Access ▾ Logged in as: dma, [logout]

Conduit

Conduit is a data management application based on Python/Celery.

Features of *Conduit* include:

- **Data set ingest pipeline**
 - Flexible creation of data set ingestion pipelines based on a modular set of tasks.
 - Monitoring the data set package creation process down to the execution of individual tasks.
 - Versioning of dataset packages.
- **Digital preservation**
 - Scalable format migration to ensure access and usability of data sets on the long-term.
 - Capturing data set provenance to keep track of data set derivation paths and manipulation operations.
- **Managed metadata**
 - Validation of core metadata compliance according to defined requirements.
 - Enrichment and quality assessment of provided metadata.



Data Management interfaces

swagger			
Hello, dma		Django Logout	Authorize
Conduit REST API			
checkout_working_copy	ShowHide	List Operations	Expand Operations
create_dma_user	ShowHide	List Operations	Expand Operations
directoryjson	ShowHide	List Operations	Expand Operations
get_dataset_entry_stream	ShowHide	List Operations	Expand Operations
index_data_asset	ShowHide	List Operations	Expand Operations
informationpackages	ShowHide	List Operations	Expand Operations
internalid	ShowHide	List Operations	Expand Operations
ipfcfrombackend	ShowHide	List Operations	Expand Operations
submissions	ShowHide	List Operations	Expand Operations
upload	ShowHide	List Operations	Expand Operations

ResourceSync Harvesting Interface

```
<urlset xsi:schemaLocation="http://www.sitemaps.org/schemas/sitemap/0.9 http://www.sitemaps.org/schemas/sitemap/0.9/sitemap.xsd">
  <rs:ln rel="up" href="http://conduit.apps.dma-cloud.catalysts.cc:80/conduit/rs/capabilitylist.xml"/>
  <rs:ln rel="index" href="http://conduit.apps.dma-cloud.catalysts.cc:80/conduit/rs/changelist.xml"/>
  <rs:md capability="changelist" from="2017-01-01T00:00:00Z" until="2018-03-02T10:35:01Z"/>
  <url>
    <loc>
      http://conduit.apps.dma-cloud.catalysts.cc:80/conduit/rs/resources/dma:22e5f3e34f073b1ba9d712b145817acd9114f61f
    </loc>
    <rs:md change="updated" datetime="2018-02-02T11:40:34Z"/>
  </url>
</urlset>
```

checkout_working_copy

POST

/conduit/api/checkout_working_copy/{identifier}/

Checkout a working copy

Implementation Notes

Checkout a working copy

The stored data asset cannot be edited or changed directly. It is required to checkout a working copy first. It is possible to checkout the complete data asset or metadata only.

To checkout the data asset including all datasets use the following command:

```
curl -v -X POST http://localhost:8000/conduit/api/checkoutworkingcopy/ait:1a51edc908b3c5b90ef7180b92d9d5bcf64b753e/
```

And to checkout metadata only use:

```
curl -d '{"metadataonly": "true"}' -X POST http://localhost:8000/conduit/api/checkoutworkingcopy/ait:1a51edc908b3c5b90ef7180b92d9d5bcf64b753e/
```

Parameters

Parameter	Value	Description	Parameter Type	Data Type
identifier	(required)		path	string

Response Messages

HTTP Status Code	Reason	Response Model	Headers
201			

Try it out!

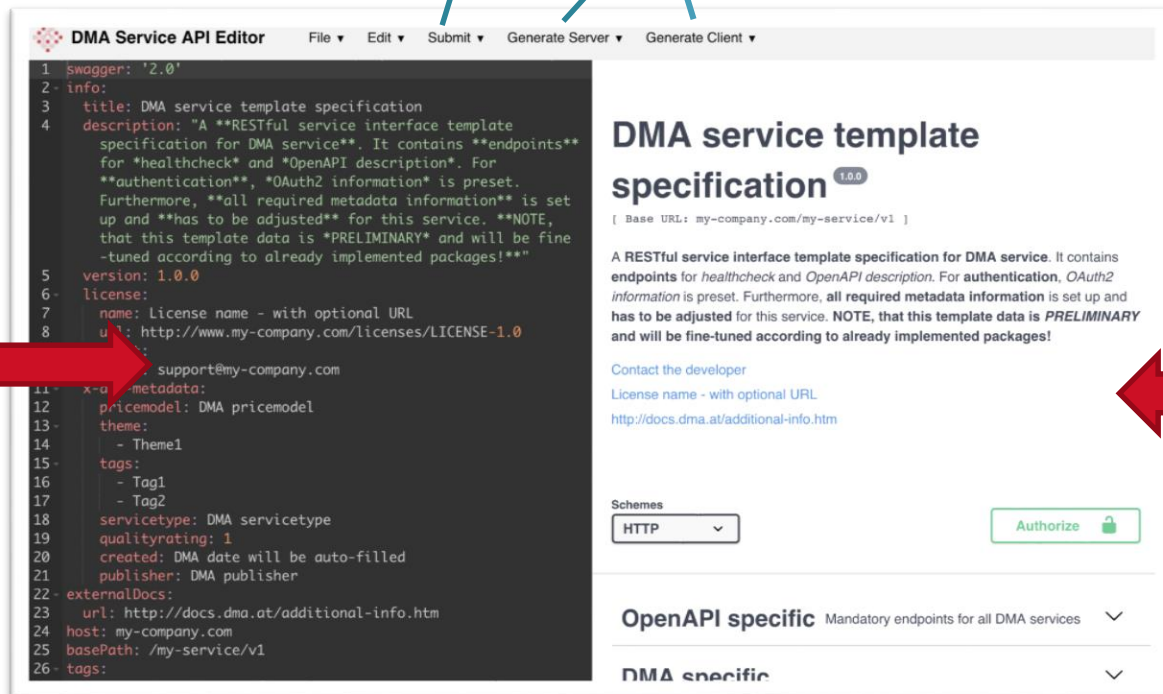
DMA Service API Editor I

Submit
to DMA

Generate code with all
boilerplate components

API Editing

API Documentation



The screenshot shows the DMA Service API Editor interface. The left pane displays the API specification in Swagger 2.0 format, with line numbers 1 through 26. The right pane shows the rendered API documentation, titled "DMA service template specification" with version 1.0.0. The documentation includes a base URL, a description of the service, and contact information. At the bottom, there are sections for "OpenAPI specific" and "DMA specific" endpoints.

```

1 swagger: '2.0'
2 info:
3   title: DMA service template specification
4   description: "A **RESTful service interface template specification for DMA service**. It contains **endpoints** for *healthcheck* and *OpenAPI description*. For **authentication**, *OAuth2 information* is preset. Furthermore, **all required metadata information** is set up and **has to be adjusted** for this service. **NOTE**, that this template data is *PRELIMINARY* and will be fine-tuned according to already implemented packages!"
5   version: 1.0.0
6   license:
7     name: License name - with optional URL
8     url: http://www.my-company.com/licenses/LICENSE-1.0
9
10  x-dma-metadata:
11    - support@my-company.com
12  x-ua-metadata:
13    pricemodel: DMA pricemodel
14    theme:
15      - Theme1
16    tags:
17      - Tag1
18      - Tag2
19    servicetype: DMA servicetype
20    qualityrating: 1
21    created: DMA date will be auto-filled
22    publisher: DMA publisher
23  externalDocs:
24    url: http://docs.dma.at/additional-info.htm
25    host: my-company.com
26    basePath: /my-service/v1
27    tags:
  
```

DMA service template specification ^{1.0.0}

[Base URL: my-company.com/my-service/v1]

A RESTful service interface template specification for DMA service. It contains endpoints for healthcheck and OpenAPI description. For authentication, OAuth2 information is preset. Furthermore, all required metadata information is set up and has to be adjusted for this service. NOTE, that this template data is PRELIMINARY and will be fine-tuned according to already implemented packages!

Contact the developer
License name - with optional URL
<http://docs.dma.at/additional-info.htm>


Schemes
HTTP

Authorize

OpenAPI specific Mandatory endpoints for all DMA services

DMA specific




"DMA Data Model License" generation


Administration ▾ Lizenzen ▾ Angebote ▾

Eingeloggt als **test**. [Ausloggen](#).

Lizenz anlegen

Lizenz konfigurieren

Auf dieser Seite kann eine Data Market Austria Lizenz zusammengestellt werden. Für einige der Klauseln stehen mehrere Alternativen zur Auswahl. Durch Klicken des Symbols  wird die jeweils nächste Alternative angezeigt. Gibt es keine weitere Alternative mehr, wird wieder die erste Klausel angezeigt. Manche Klauseln sind optional und können daher durch Klicken des Symbols  deaktiviert bzw. durch Klicken auf  wieder aktiviert werden.

Einige Klauseln beinhalten Parameter. Ein Beispiel ist die Gewährleistungsdauer, für die eine bestimmte Anzahl an Monaten festgelegt werden kann.

Beachten Sie, dass es logische Abhängigkeiten zwischen Klauseln gibt. So kann zum Beispiel das Deaktivieren einer Klausel zur Folge haben, dass weitere Klauseln deaktiviert werden. Oder eine Klausel kann nicht aktiviert werden, weil sie nicht mit einer anderen aktivierten Klausel kompatibel ist. Beachten Sie diesbezüglich die entsprechenden Hinweismeldungen.

Abschließend kann die Lizenz durch Klicken auf "Lizenztext erzeugen" generiert werden. Das Dokument erhält einen Identifikator (SHA-256 Hash), über den die Lizenz referenziert und angezeigt werden kann.

Data Market Austria Lizenz

Präambel

s01-00000

Diese LIZENZ ist ein rechtsgültiger Vertrag zwischen dem DATA MARKET PROVIDER und dem DATA MARKET CUSTOMER ("Business-to-Business").

s01-01000

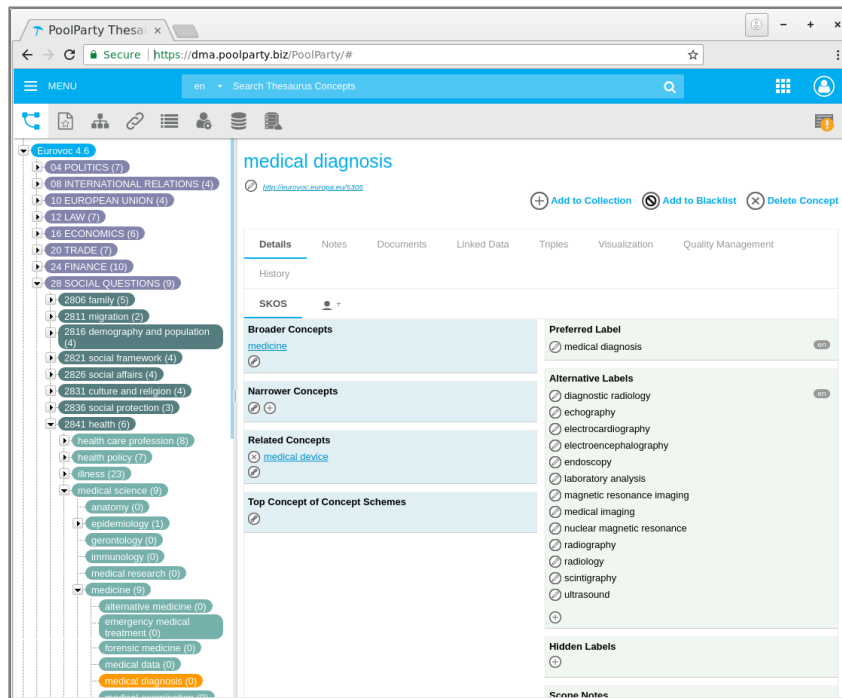
Die LIZENZ regelt abschließend die gegenseitigen Rechte und Pflichten aus dem DATA ASSET KAUF.

Definitionen

s02-00000

ALLGEMEINE GESCHÄFTSBEDINGUNGEN ("AGB") bezeichnet einseitig vorformulierte Vertragsbedingungen des DMP und/oder des DMP.

Controlled vocabularies



The screenshot displays the PoolParty Thesaurus web application. The browser address bar shows the URL <https://dma.poolparty.biz/PoolParty/#>. The interface includes a left-hand navigation menu with a tree structure of concepts. The main content area is titled 'medical diagnosis' and features a tabbed interface with 'Details' selected. The 'Details' tab shows the following information:

- SKOS**: A list of SKOS concepts including 'medicine', 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Broader Concepts**: A list of broader concepts including 'medicine', 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Narrower Concepts**: A list of narrower concepts including 'medicine', 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Related Concepts**: A list of related concepts including 'medicine', 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Top Concept of Concept Schemes**: A list of top concepts including 'medicine', 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Preferred Label**: A list of preferred labels including 'medical diagnosis'.
- Alternative Labels**: A list of alternative labels including 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Hidden Labels**: A list of hidden labels including 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.
- Source Notes**: A list of source notes including 'diagnostic radiology', 'echography', 'electrocardiography', 'electroencephalography', 'endoscopy', 'laboratory analysis', 'magnetic resonance imaging', 'medical imaging', 'nuclear magnetic resonance', 'radiography', 'radiology', 'scintigraphy', and 'ultrasound'.

The DMA Knowledge Graph: Benefits

- Allows high-quality **Data Acquisition**
- Enables efficient **Data Integration**
- Improves **Search and Recommendation**
- As well as highly-targeted **Matchmaking** between Demand and Supply
- Is 100% **standards-compliant** (W3C)
- Is based on **Metadata AND Data** itself
- Establishes a **Graph** between **Data, Services, Organisations, Users** etc.
- Including rich **Semantics / Context**

AND THEREBY PROVIDES THE BASIS FOR A WORKING & INNOVATIVE DATA ECOSYSTEM IN DATA MARKET AUSTRIA!



DATA MARKET AUSTRIA

Österreichs erstes digitales Ökosystem für
Daten, Business und Innovation

Welcome !

to Data Market Austria

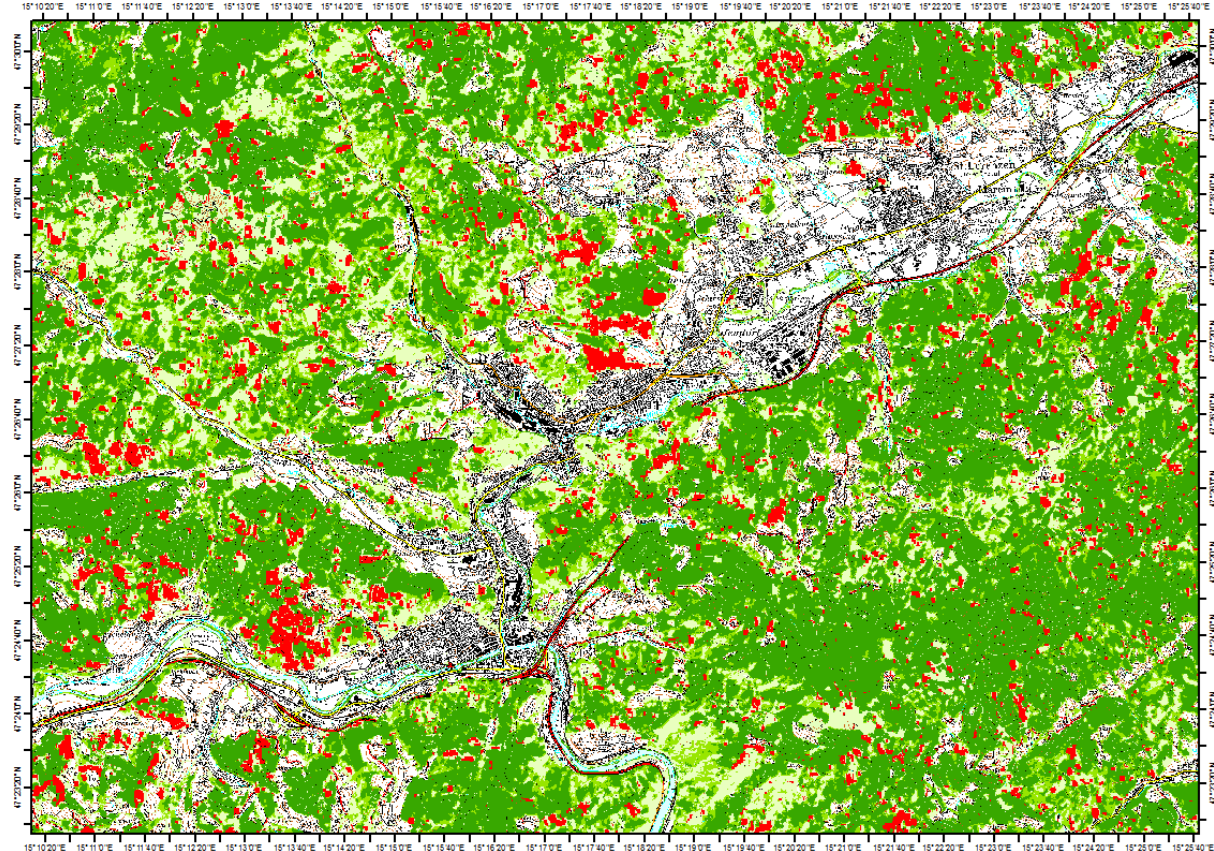
This is the Entrypoint to the central node of the DMA project.

Inhalt

- Motivation and general structure
- Technology
- Pilots
- Community, Sustainability, Legal
- Outlook

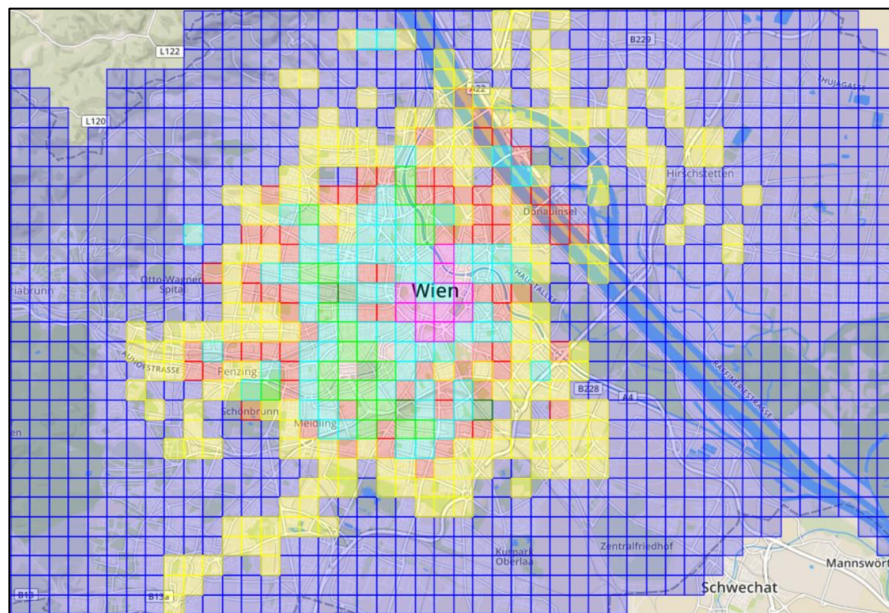
Forest (Change) Monitoring

- Result of Forest (Change) Monitoring
- Data from:
 - Sentinel satellites
 - Styrian government
- Forest Type Map (Coniferous, Broadleaf, Mixed Forest)
- Change areas in **RED**
- Input for service → „Updated Rockfall Propagation“



Detecting Practical Borders of Prediction Models Classifying T-Mobile Data: Absolute Clusters

- Absolute clusters show the regions of similar number of people during a day
- *These clusters can help in energy forecasting to normalize the predicted values*



Inhalt

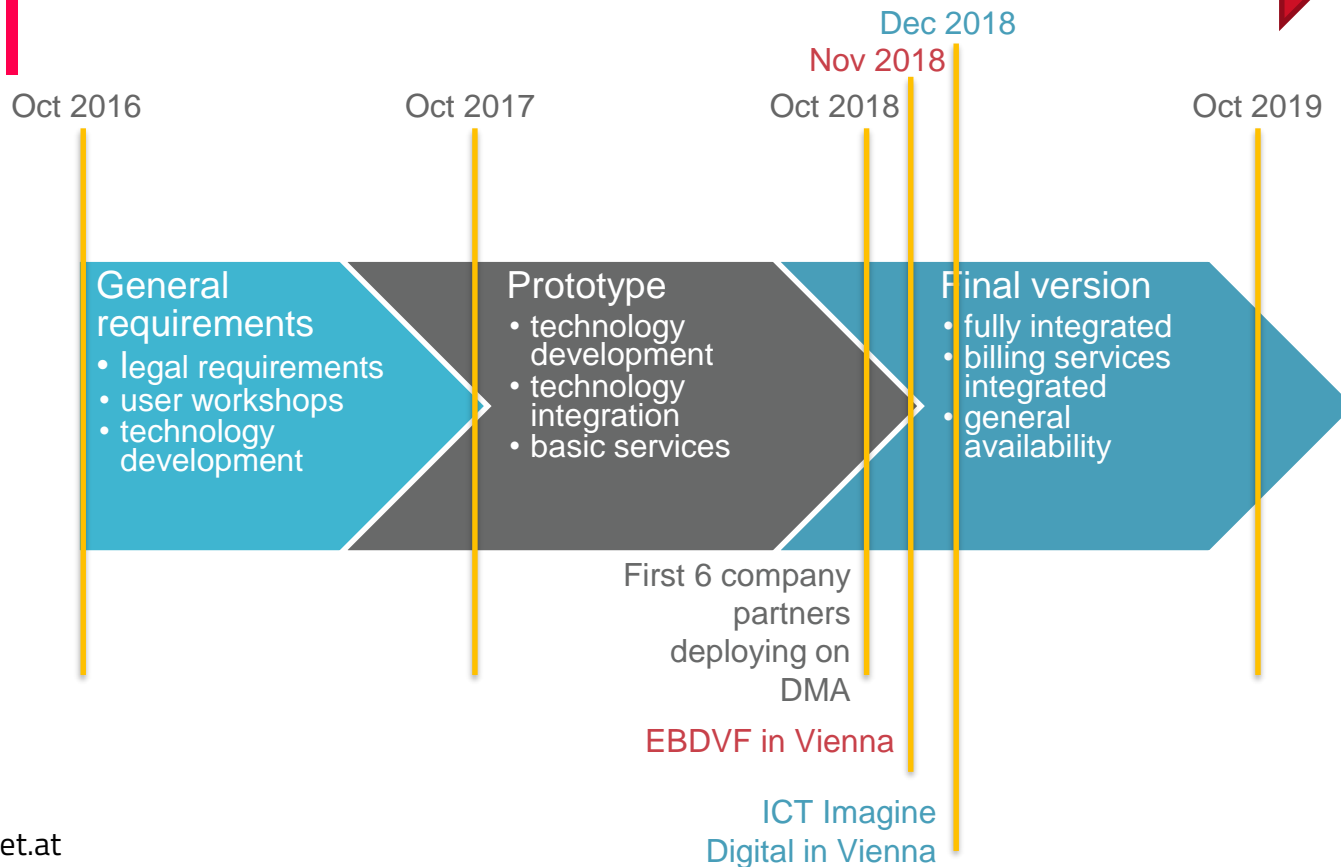
- Motivation and general structure
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Community & Dissemination: DMA Partner Programme (for project duration)

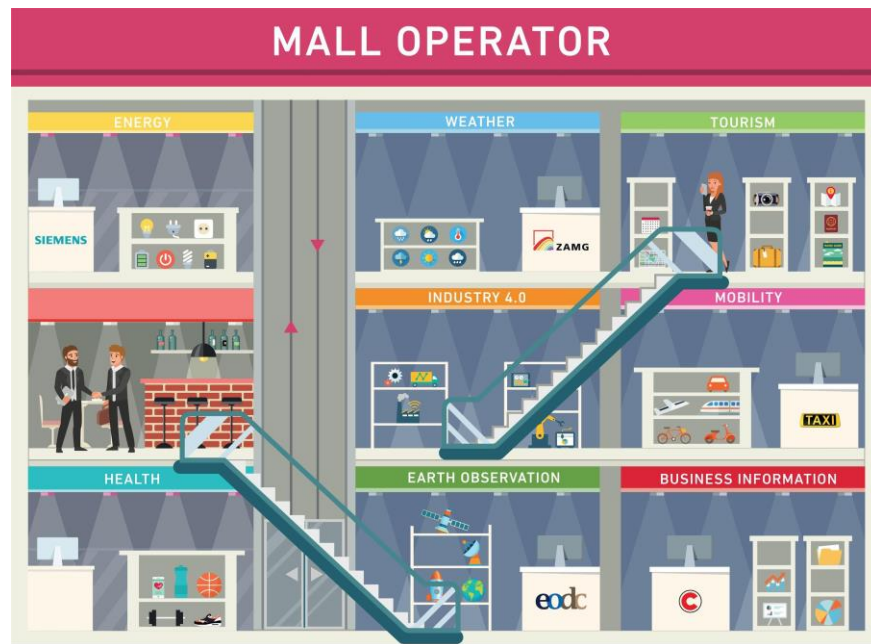


Timeline

Business Model Development



Business model development



The DMA is designed as a **mall operator** (central node), who provides the infrastructure and supports the contracting parties with different processes and services e.g.:

- Registration
- Identification
- Catalogue of data and services
- Search functions
- Contracting
- Billing
- Payment services

Community & Dissemination: Incubator Call 2018



6 bewilligte Projekte

- Integration of Geospatial Services for the DMA
- Semantic Containers
- Sophisticated Web Information Service (SWIS)
- Mental Health Research-Kit
- Innovative Frequenzzählung mittels anonymisierten standortbezogenen Mobilfunkdaten (ASM-Daten)
- AAL+Healthcare Data: Exploration of Usage Scenarios, Dataset Structures, Legal Considerations and Business Models for the Data Market Austria

New call in 2019

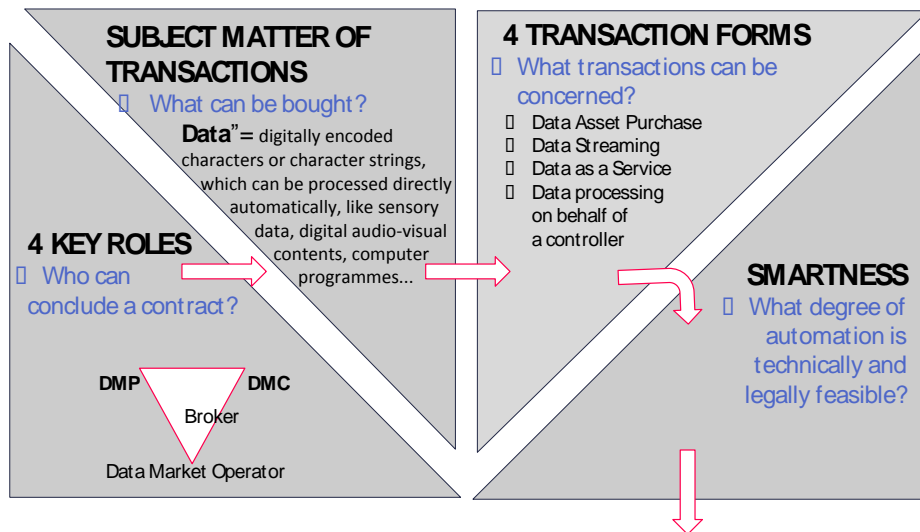
Final Report on Legal, Social and Cultural Aspects

Deliverable number

D3.4

2	Modelle für (self executing) Smart Contracts.....	11
3	DMP-DMC: Lizenzvertrag	25
4	Broker-DMP/DMC: Vermittlungsvertrag	63
5	Data Market Austria: Entwurf einer „Allgemeine Nutzungsbedingung“ (DMA AGB) für Datenanbieter (DMP), Datennachfrager (DMC) und Datenbroker (DMB)	73
6	Data Market Austria: Entwurf eines “Code of Conduct”	86
7	Leitlinien für DMP betreffend Datenschutz	92

Smart Contracts



3 phases of a contract are taken into account:



publications

- Johann Höchtel, Thomas J. Lampoltshammer;
Social Implications of a Data Market.
CeDEM17 - Conference for E-Democracy
and Open Government; 2017
- Rinnerbauer, B., Thurnay, L.,
Lampoltshammer, T. J. **Limitations of Legal
Warranty in Trade of Data.** Proceedings of
the International Conference EGOV-CeDEM-
ePart 2018,
- Höchtel, B.; **Making Economic Use of Data
and Protecting Individuals from Full
Transparency: An Opposing Pair?.** Medien
und Recht International, 2018 (vol. 15)
- G. Viale Pereira, S. Virkar, M. Vignoli,
**Exploring the political, social and cultural
challenges and possibilities associated
with trading data: the case of Data Market
Austria (DMA).** In Conference on Digital
Government Research: Governance in the
Data Age. 2018
- Matthias Traub, Heimo Gursch, Elisabeth
Lex, Roman Kern; **Data Market Austria:
Austria's First Digital Ecosystem for
Data, Businesses, and Innovation;
Exploring a changing view on
organizing value creation: Developing
New Business Models.** 2017
- Ivanschitz, B-P.; Lampoltshammer, T.J.;
Mireles, V.; Revenko, A.; Schlarb, S.;
Thurnay, L. **A Data Market with
Decentralized Repositories.** 2018
- Ivanschitz, B-P.; Lampoltshammer, T.J.;
Mireles, V.; Revenko, A.; Schlarb, S.;
Thurnay, L. **A Semantic Catalogue for
the Data Market Austria.** 2018
- Ivanschitz, B-P.; Karl, R.; King, R.;
Lampoltshammer, T.J.; Mireles, V.;
Schlarb, S.; Thurnay, L. **Using Blockchain
Technology to Manage Membership
and Legal Contracts in a Distributed
Data Market.** submitted

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“

The project is technically very solid and profound progress has been made in the first period. Legally the team has shown solid expertise and good results. The reviewers believe that there is a very good chance for the project to complete successfully with significant impact.





Thanks!

Any questions?

@DataMarketAT

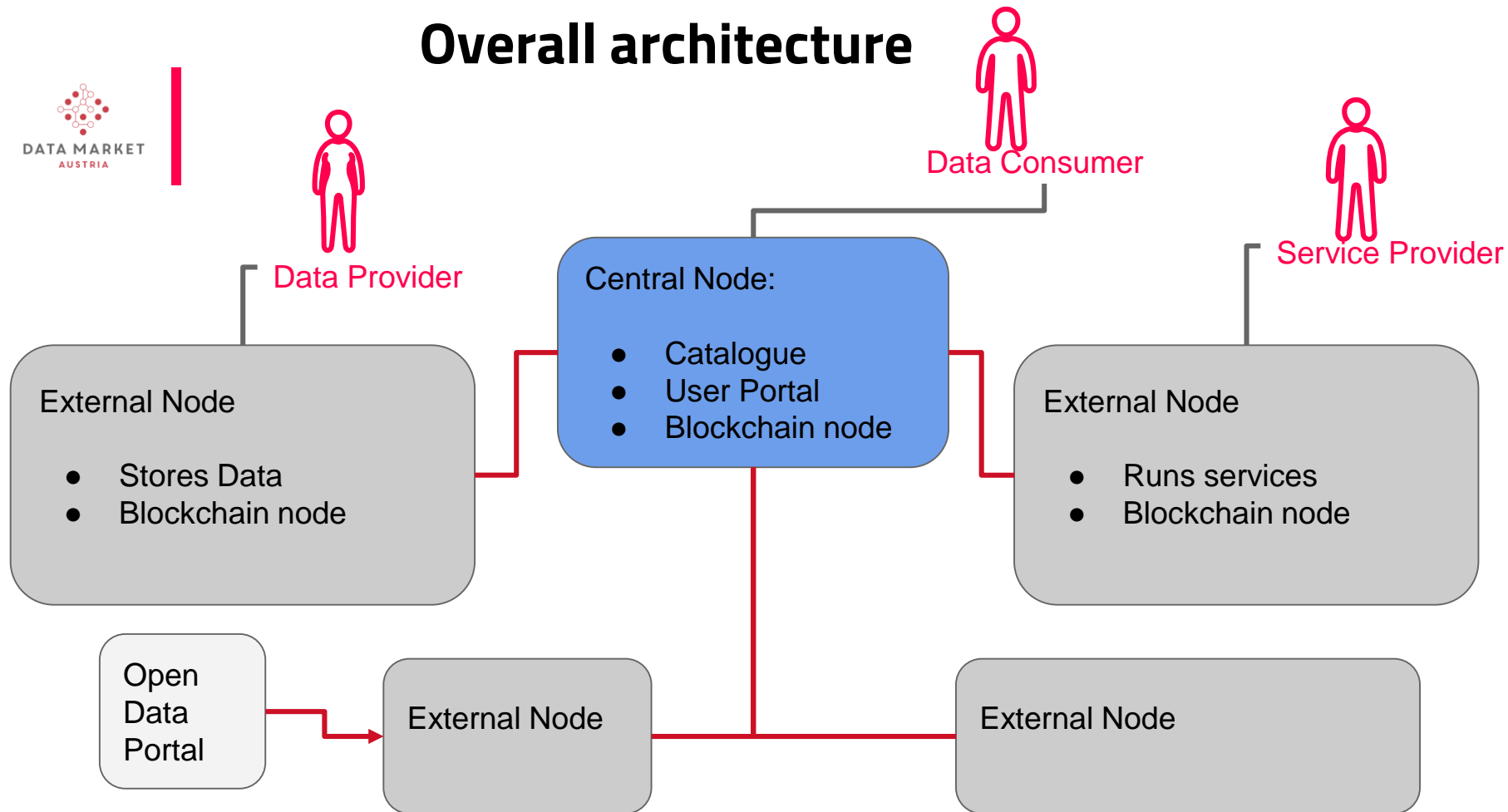
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DMA Coordinator
Studio Director | Research Studio **Data Science**
Research Studios Austria Forschungsgesellschaft mbH
www.researchstudio.at



Overall architecture



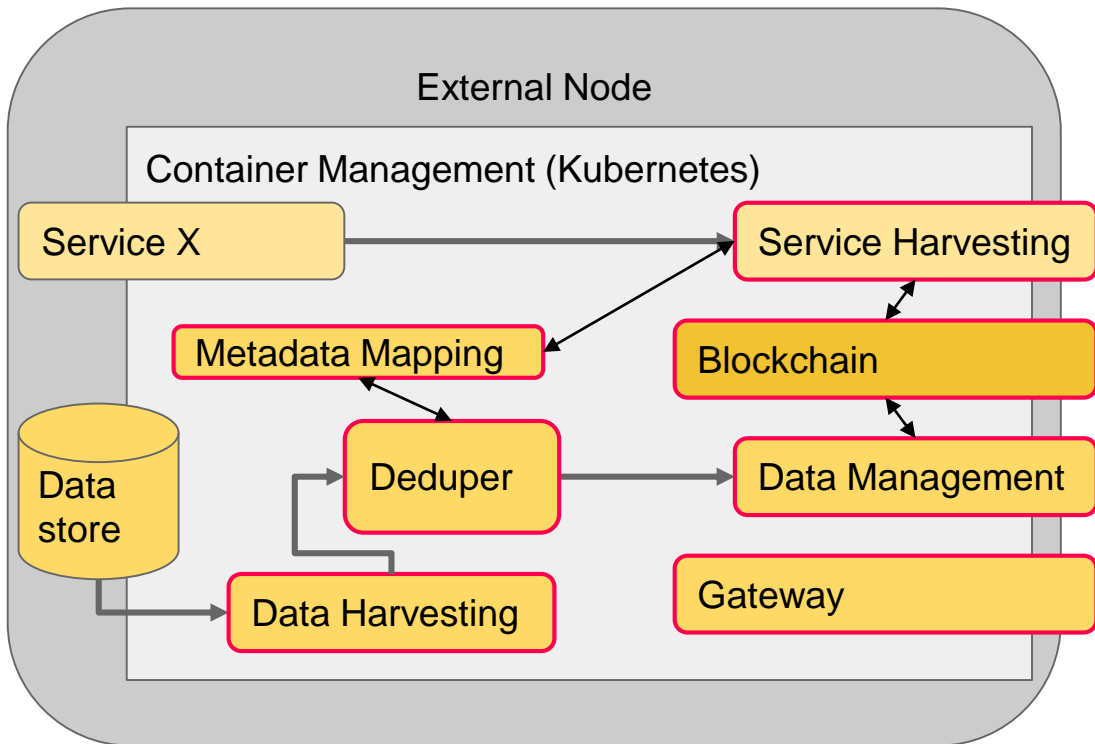
Architecture

DMA Component

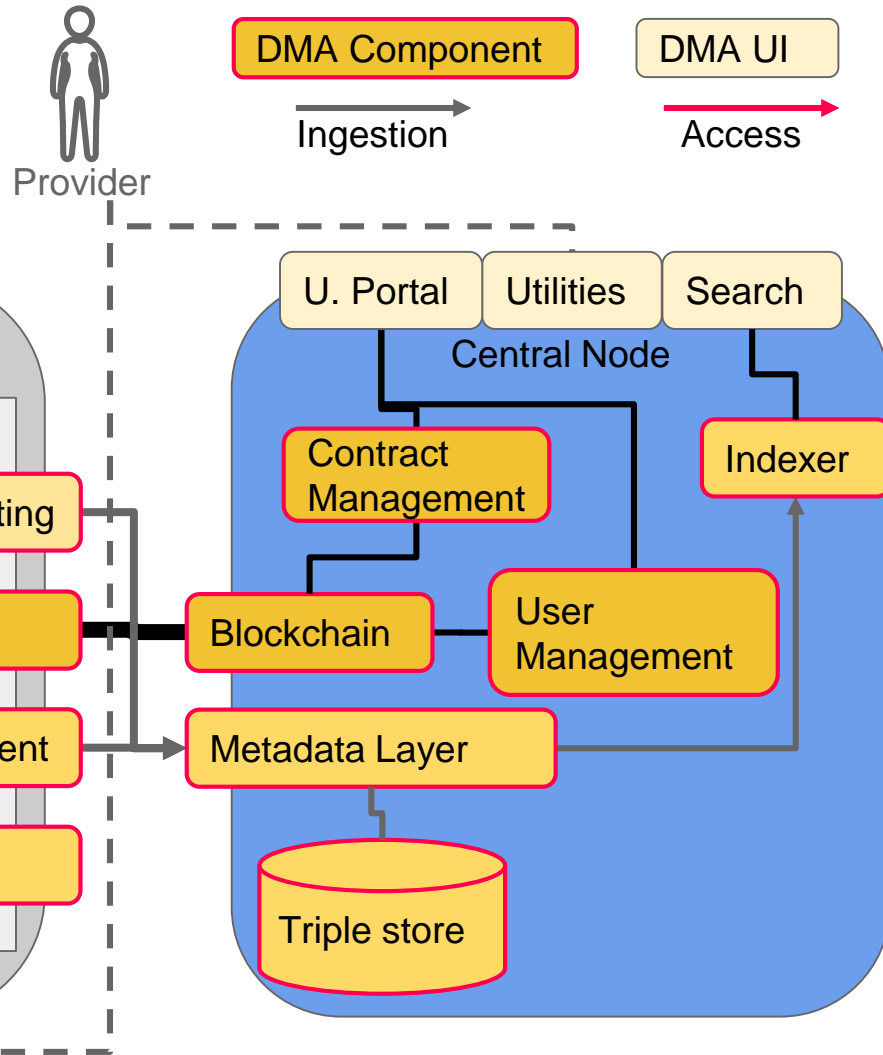
Ingestion

DMA UI

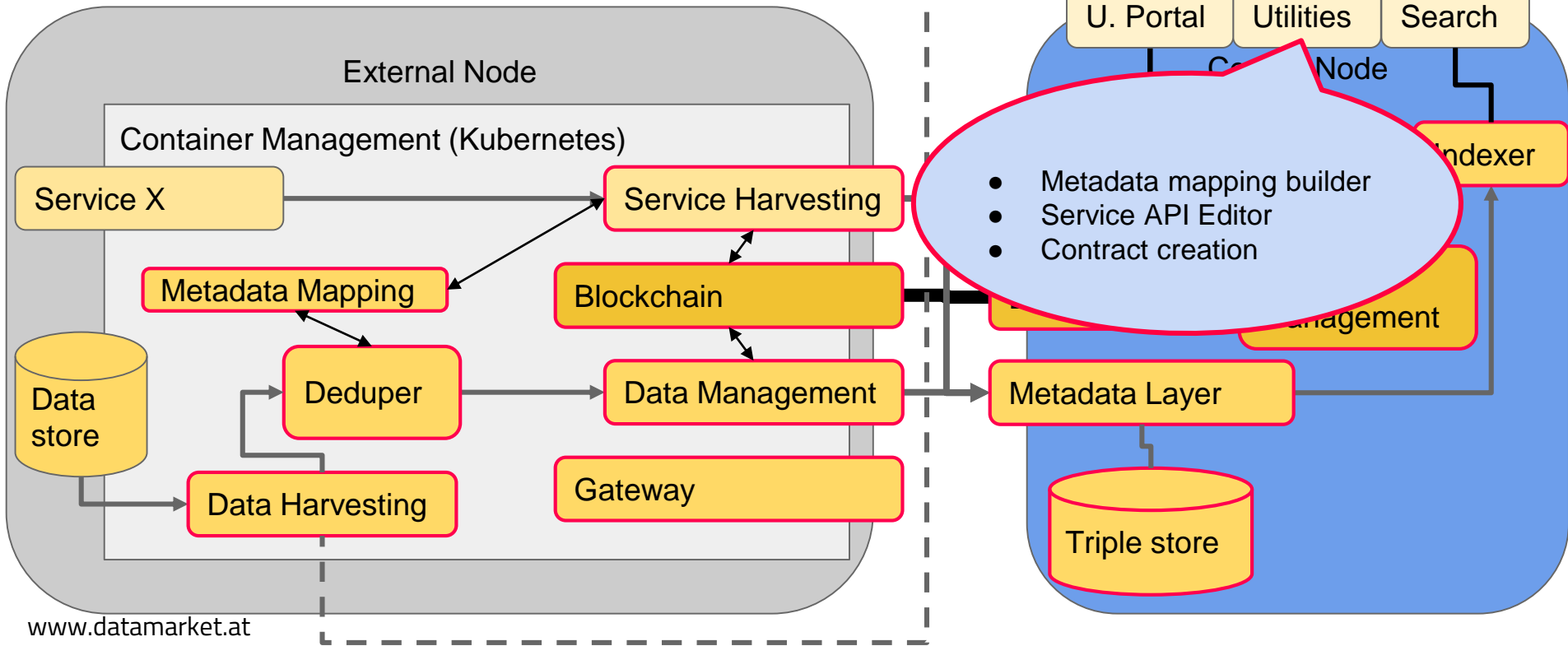
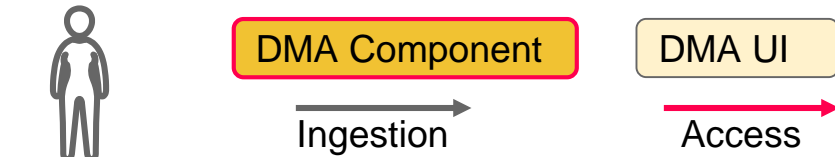
Access



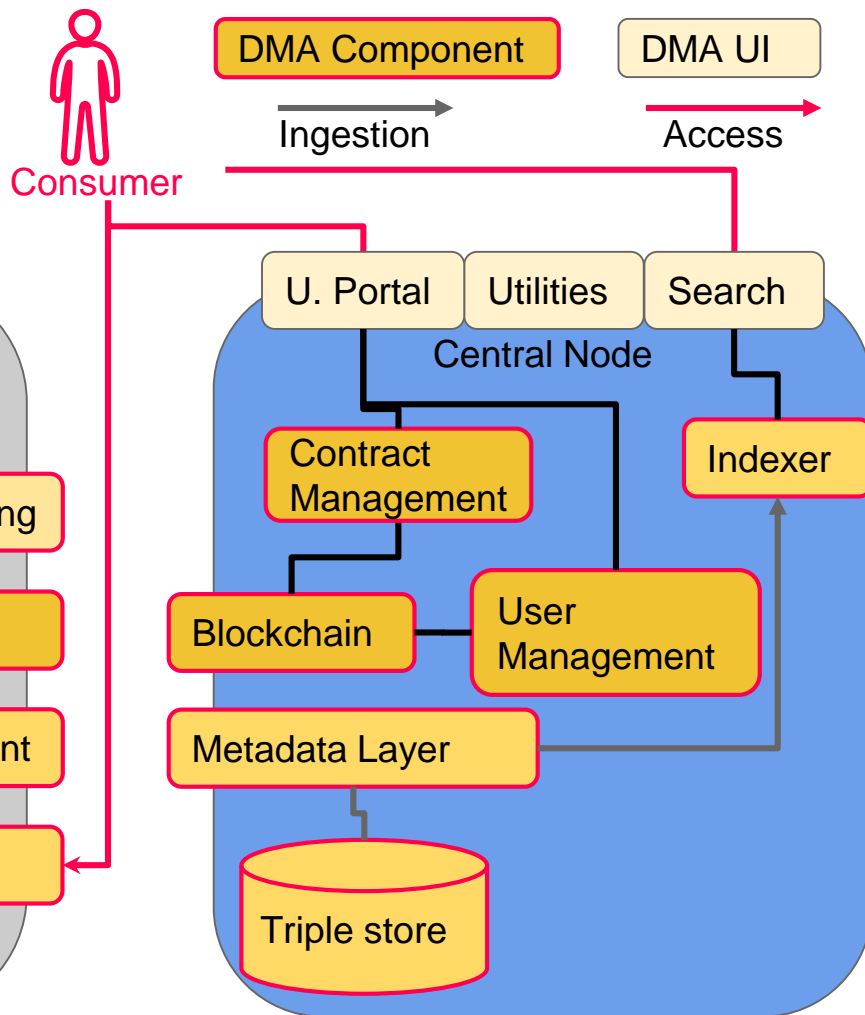
Architecture



Architecture



Architecture



Blockchain

User Management

Gateway

Metadata
Mapping

Data Management

Deduper

Data Harvesting

Service Registry

Blockchain node and API server.

For every asset, creates a key-file that the organization must used to sign any transactions involving that asset.

Optional: if not installed, all security is in the hands of the DMA

Blockchain

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If the organization wants to create its own users centrally
Optional: if not installed, all security is in the hands of the DMA

Blockchain

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Service Registry

When a consumer requests an asset, checks the blockchain for an entry confirming the purchase (if not free)

Optional: if not installed, all security is in the hands of the DMA

Blockchain

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Service Registry

This set of services take as input the data in the node and output a local catalogue of the data through a ResourceSync interface, using DMA-specified metadata standards. The identifiers of these assets come from the blockchain.

There are reference implementations by the DMA that can be installed on a node.

Optionally, an organization can choose to reimplement any or all of these components, as long as they adhere to the protocols.

Blockchain

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There are reference implementations by the DMA that can be installed on a node.

Optionally, an organization can choose to reimplement any or all of these components, as long as they adhere to the protocols.

The DMA has developed an easy-to-adapt harvester that is already integrated with the other components.

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This set of services take as input the data in the node and output a local catalogue of the data through a ResourceSync interface, using DMA-specified metadata standards. The identifiers of these assets come from the blockchain.

There are reference implementations by the DMA that can be installed on a node.

Optionally, an organization can choose to reimplement any or all of these components, as long as they adhere to the protocols.

Allows for state-less harvesting of large amounts of data, and initiates metadata mapping

Blockchain

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Service Registry

This set of services take as input the data in the node and output a local catalogue of the data through a ResourceSync interface, using DMA-specified metadata standards. The identifiers of these assets come from the blockchain.

There are reference implementations by the DMA that can be installed on a node.

Optionally, an organization can choose to reimplement any or all of these components, as long as they adhere to the protocols.

Takes care of data versioning, and assigning identifiers from the blockchain.
Optionally, exposes an endpoint for browsing datasets of single user.

Blockchain

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Service Registry

This set of services take as input the data in the node and output a local catalogue of the data through a ResourceSync interface, using DMA-specified metadata standards. The identifiers of these assets come from the blockchain.

There are reference implementations by the DMA that can be installed on a node.

Optionally, an organization can choose to reimplement any or all of these components, as long as they adhere to the protocols.

Converts metadata in JSON or XML into RDF using the DMA's controlled vocabularies and schemas.

Blockchain

User Management

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Deduper

Data Harvesting

Service Registry

Interface between the container-management solution and the DMA: monitors states of services

Optionally, an organization not requiring scalable services can go without

Steps

1. Register your organization
2. Set up components
 - a. Configure using DMA's access parameters
3. Inform DMA of access points: Gateway and ResourceSync interface
4. Do integration tests (to be defined)
5. For data:
 - a. Expose local catalogue in ResourceSync interface
 - b. DMA will harvest it and put it into central catalogue
6. For services:
 - a. Trigger Service Metadata Editor in portal, fill up, submit.