

A Framework for Producing “Information Container for linked Document Delivery (ICDD)”

Manos Argyris
Data Scientist
Amberg Group

AECO EXCHANGE & COLLABORATION

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Looking for

- Interoperability
- Future proofing
- Insights

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Current limitations

- Vendor lock-in
- Proprietary formats
- Limited functionalities

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Need

- Vendor agnostic
- Open standards
- Infrastructure for data-driven apps

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Looking for

- Interoperability
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Current limitations

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Need

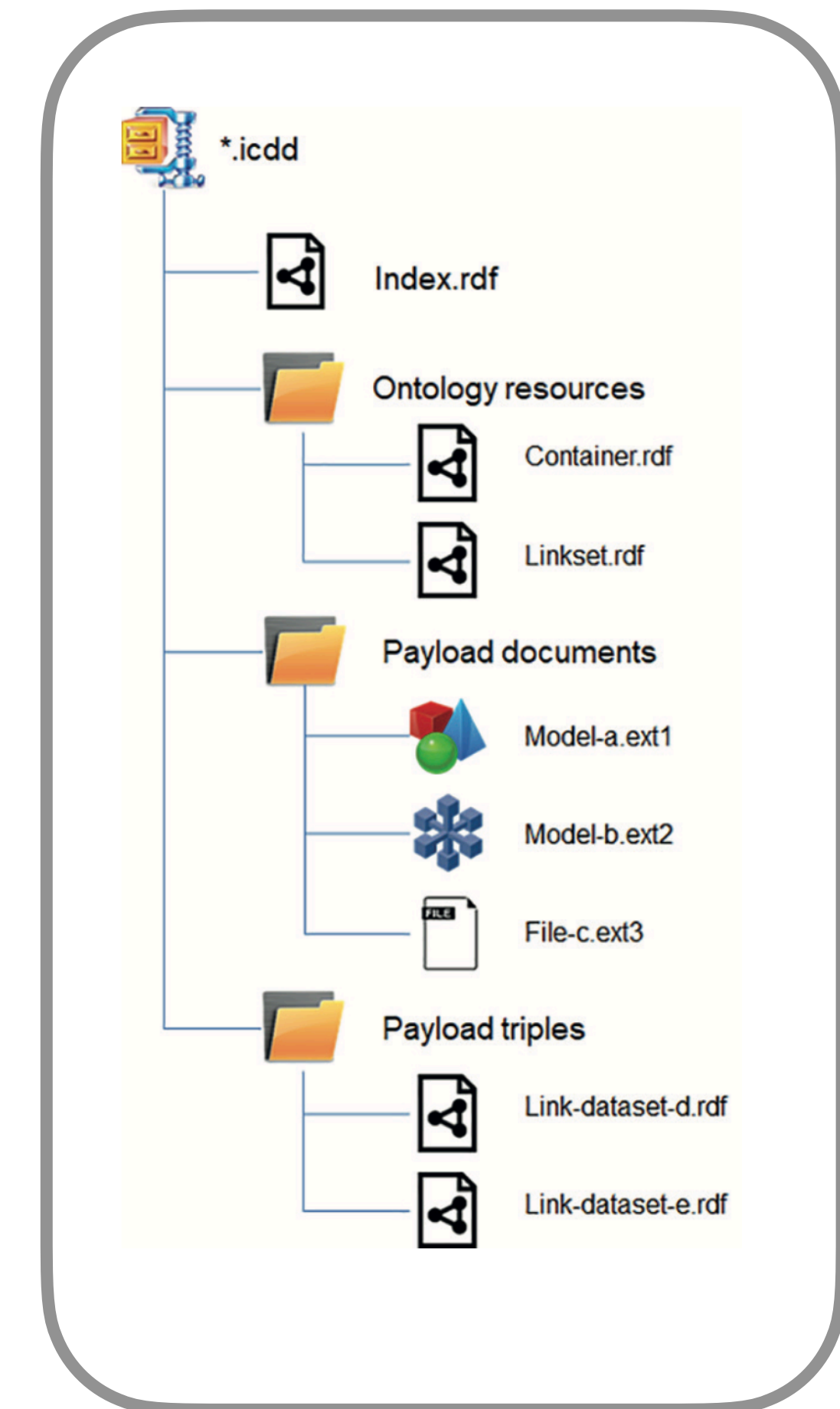
- Vendor agnostic
- Open standards
- Infrastructure for data-driven apps

Shifting from a **Document-Centric** to a **Data-Centric** perspective

ISO-21597: Information Container for linked Document Delivery

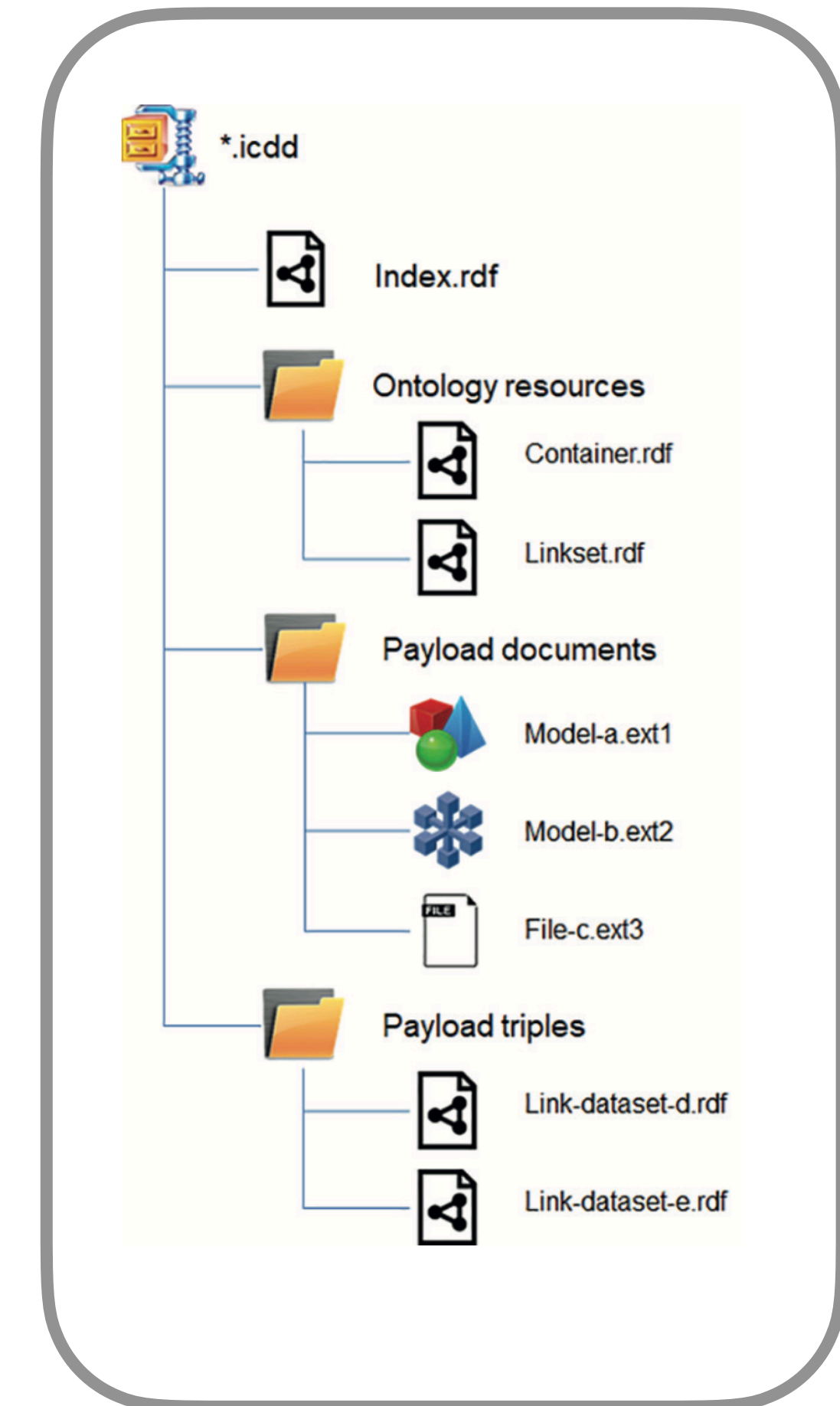
<https://www.iso.org/standard/74389.html>

“...defines an open and stable container format to exchange files of a heterogeneous nature to deliver, store and archive documents that describe an asset throughout its entire lifecycle”



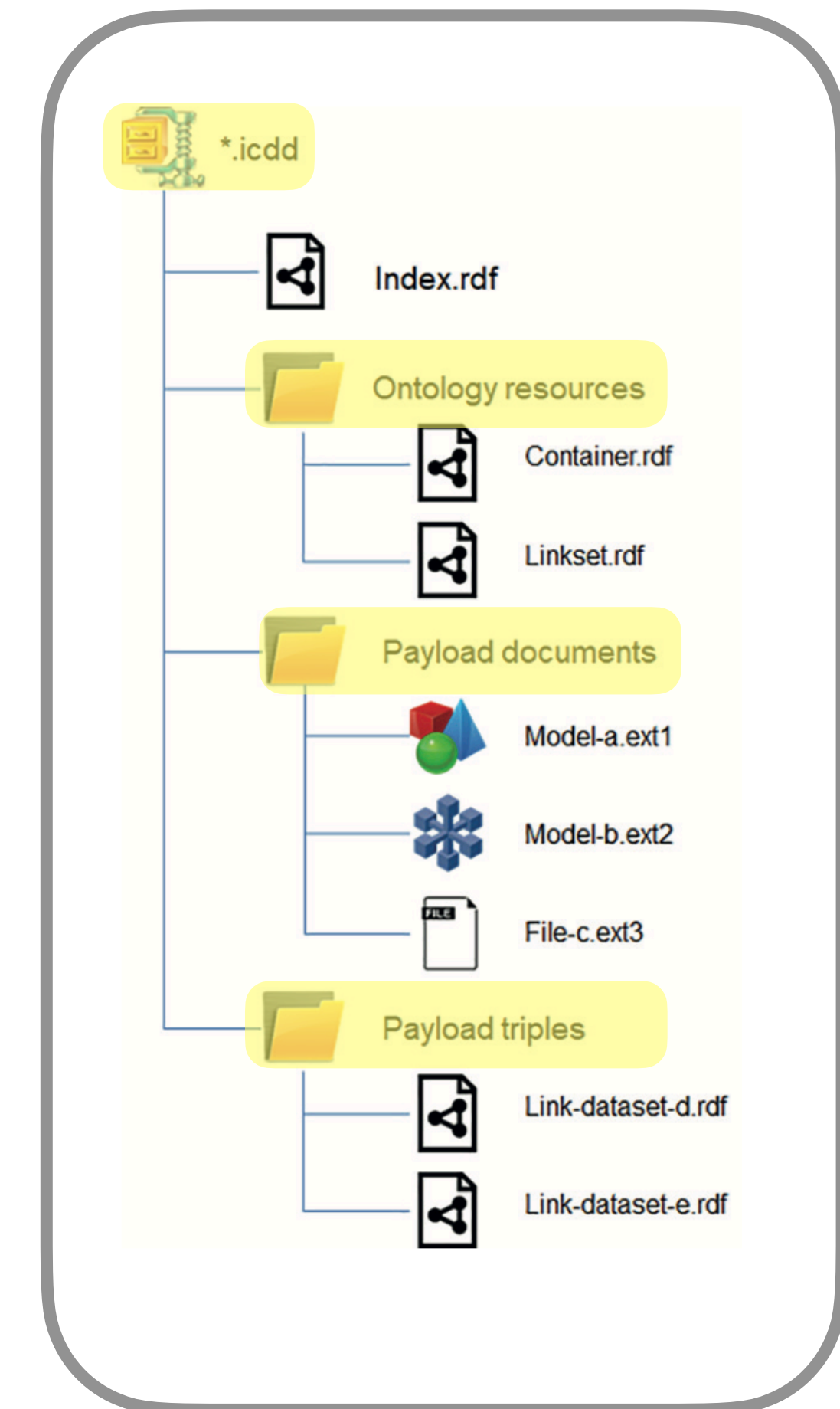
ISO-21597: Information Container for linked Document Delivery

- File Structure
- Index.rdf
- Ontology resources
- Payload documents
- Payload triples



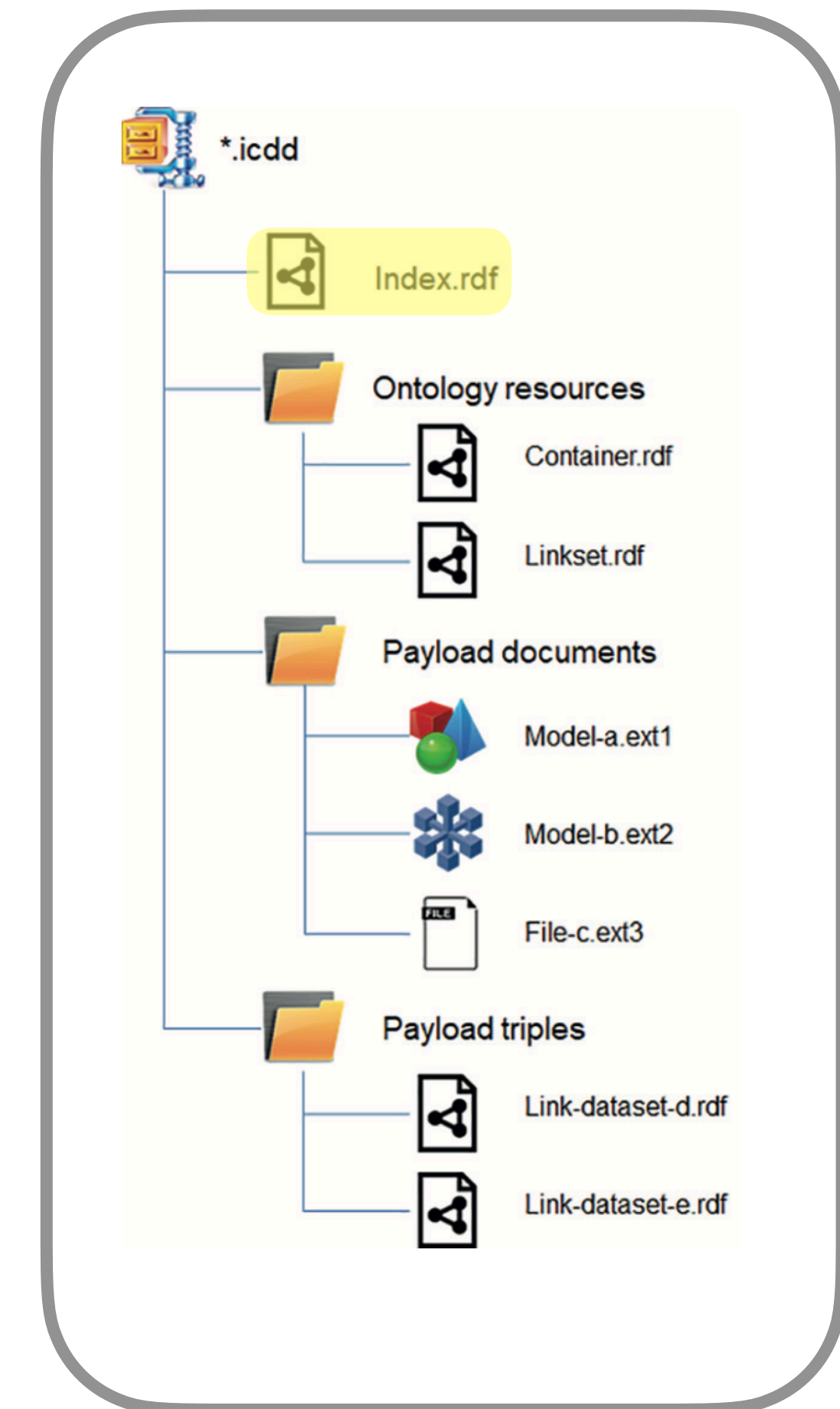
ISO-21597: Information Container for linked Document Delivery

- File Structure > Specific file structure and naming
- Index.rdf
- Ontology resources
- Payload documents
- Payload triples



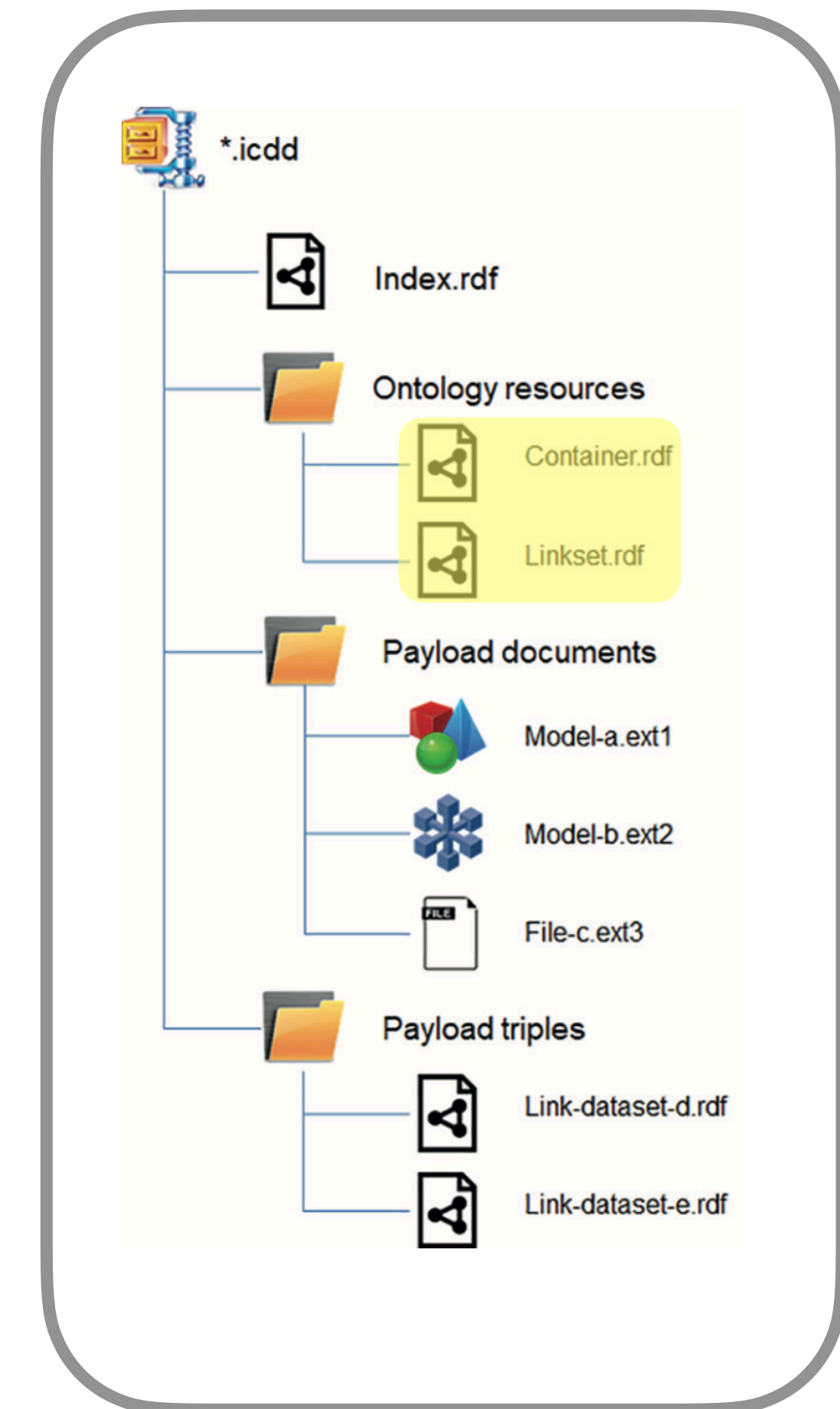
ISO-21597: Information Container for linked Document Delivery

- File Structure > Specific file structure and naming
- Index.rdf > An RDF file that indexes all included files
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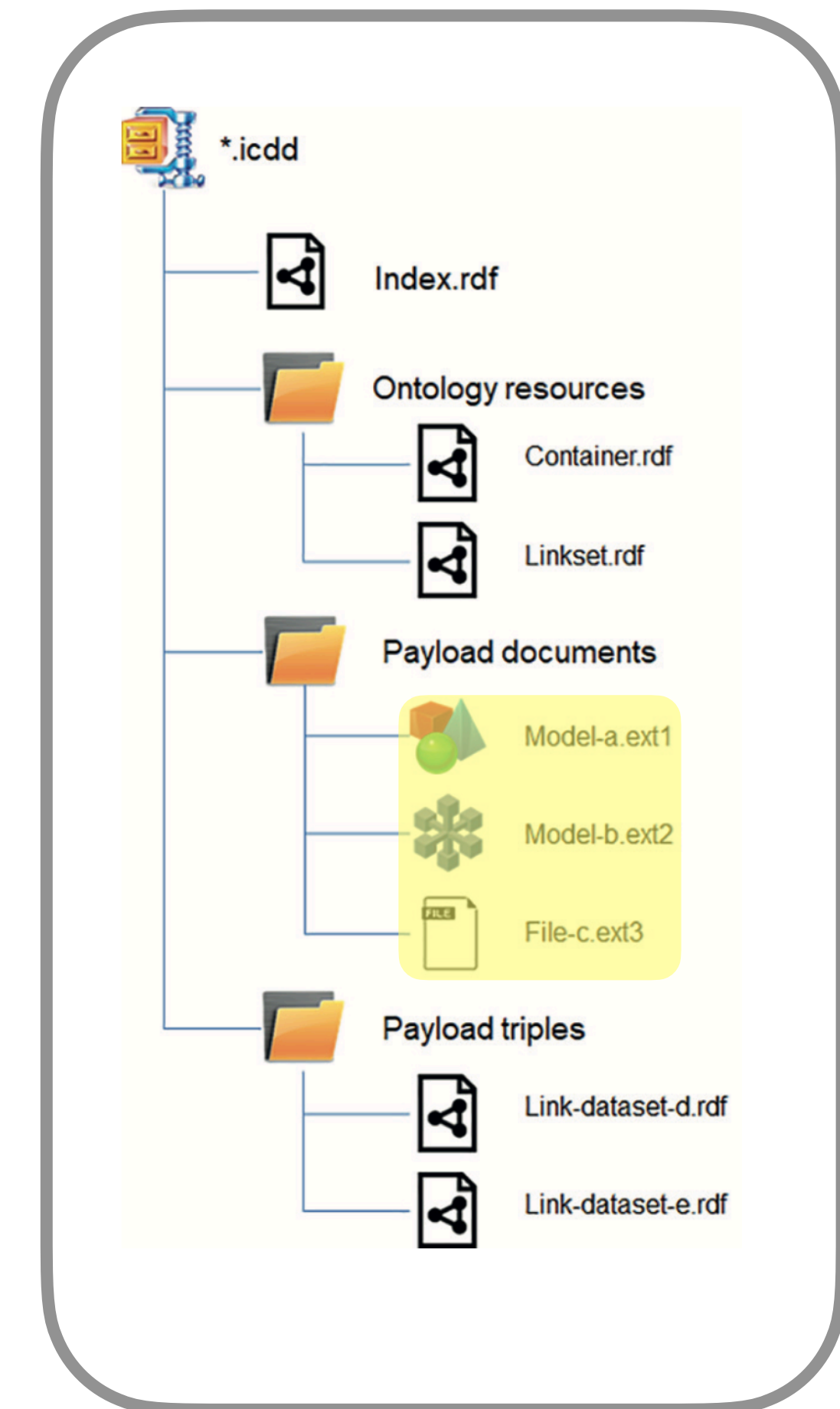
ISO-21597: Information Container for linked Document Delivery

- File Structure > Specific file structure and naming
- Index.rdf > An RDF file that indexes all included files
- Ontology resources > ISO ontologies (2 RDF files)
- Payload documents
- Payload triples



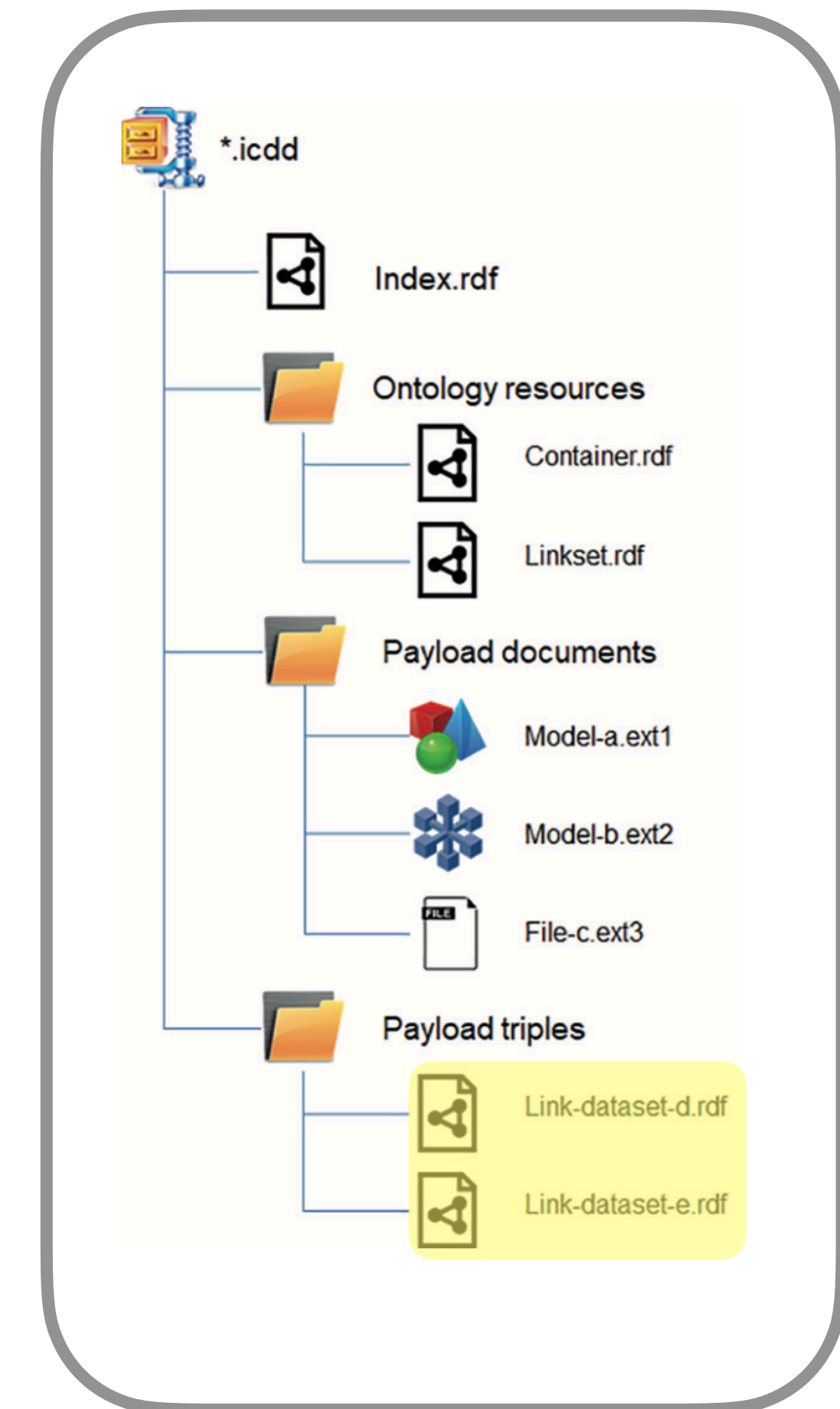
ISO-21597: Information Container for linked Document Delivery

- File Structure > Specific file structure and naming
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ISO-21597: Information Container for linked Document Delivery

- File Structure > Specific file structure and naming
- Index.rdf > An RDF file that indexes all included files
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- Payload triples > RDF file(s) containing links between files and entities *

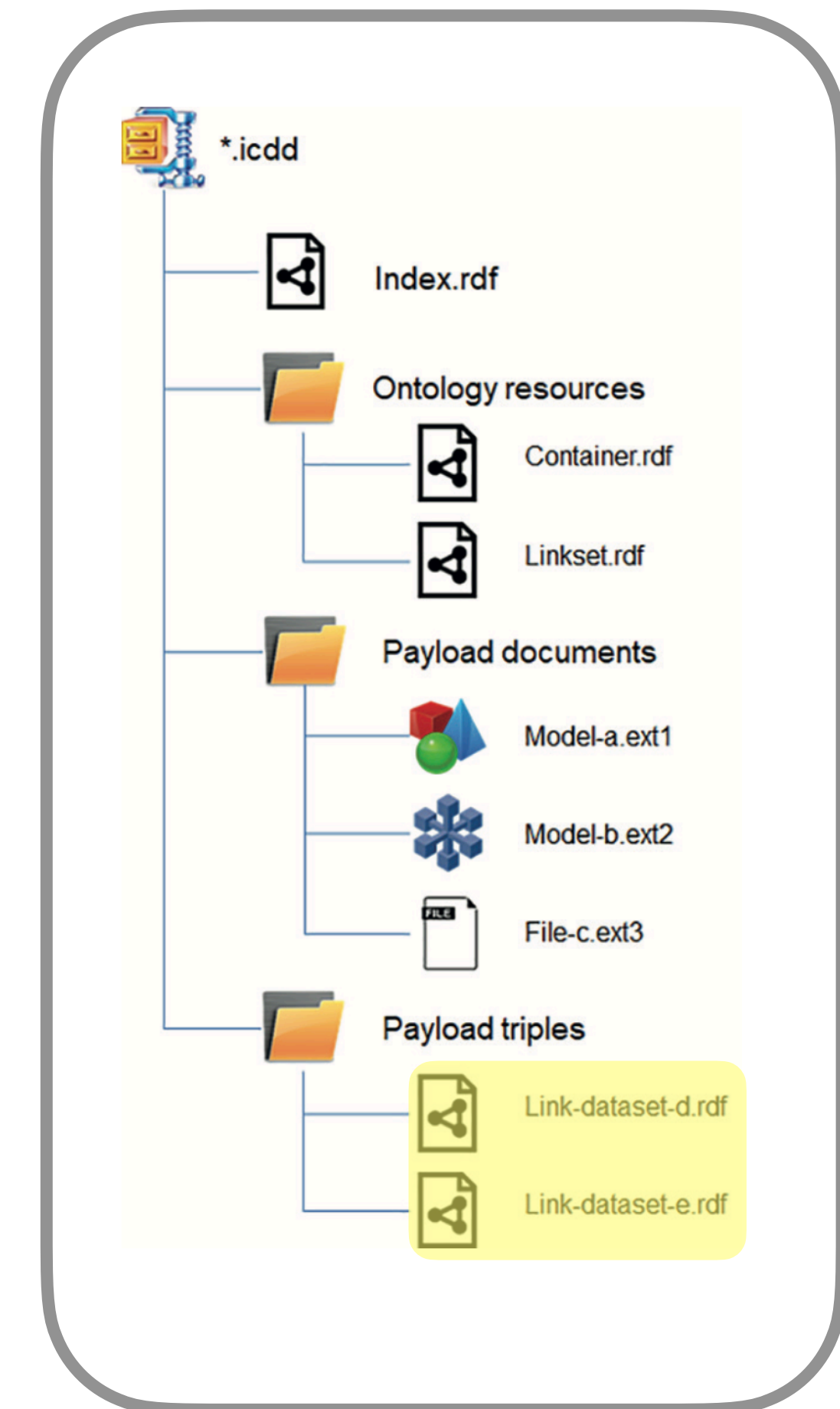


ISO-21597: Information Container for linked Document Delivery

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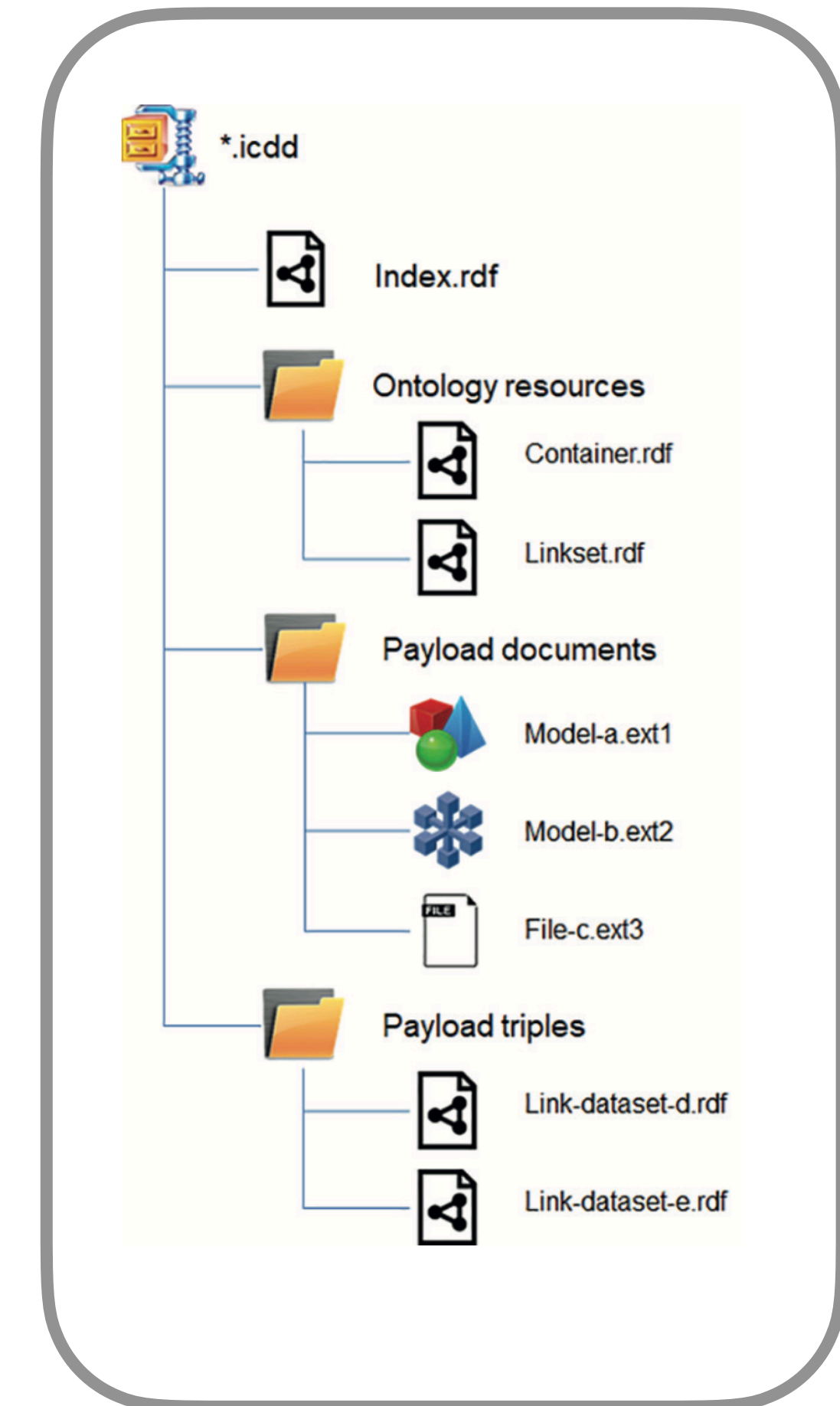
* Links

- File <> File
 - File <> Element_In_File
 - Element_In_File <> Element_In_File
- Identifiers



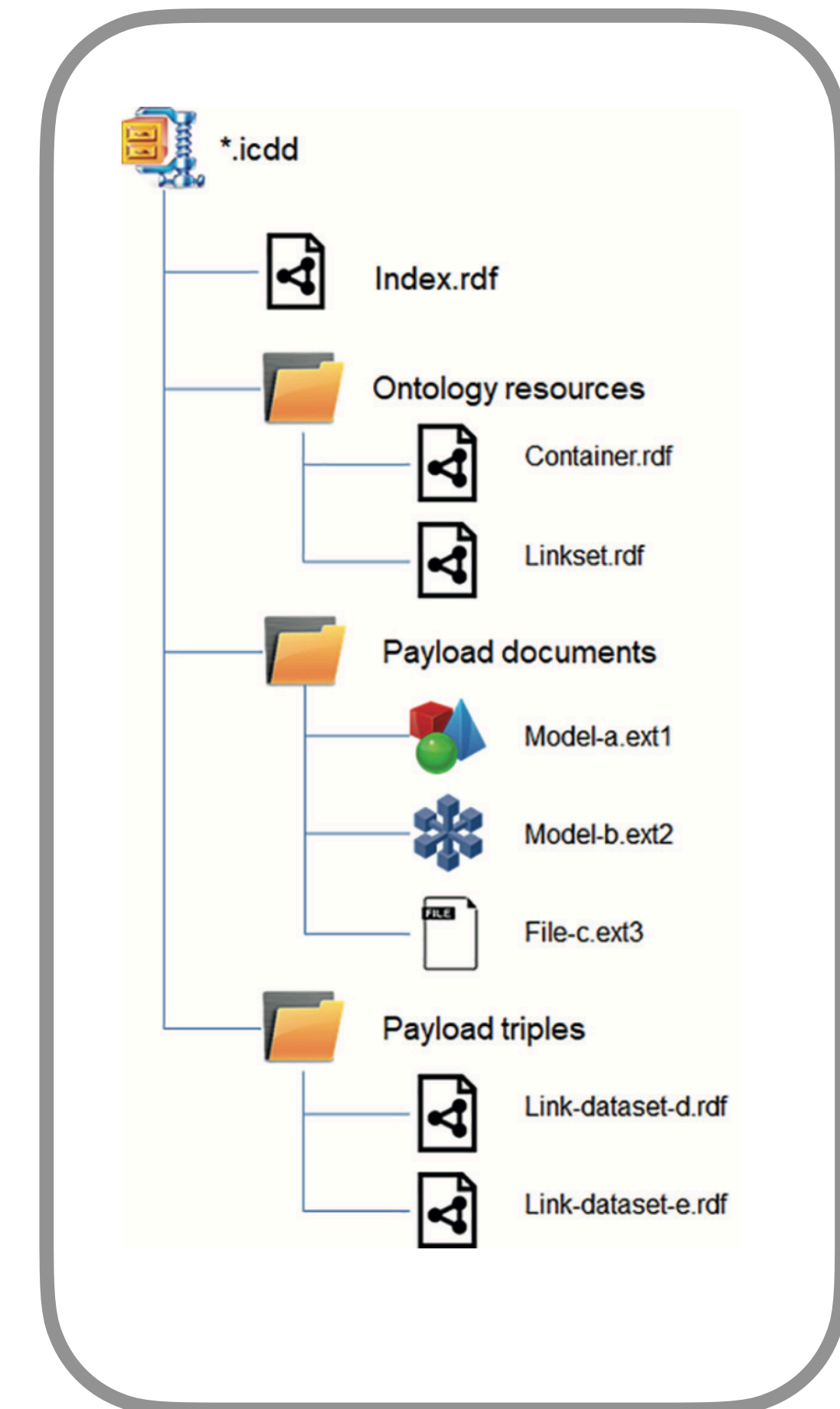
ISO-21597: Information Container for linked Document Delivery

- ▶ Any document
- ▶ Open standards (RDF)
- ▶ Any level of data granularity



Steps required

- ▶ Create file structure
- ▶ Include ontologies
- ▶ Add project files
- ▶ Produce Index.rdf
- ▶ Produce Links.rdf



Steps required

A

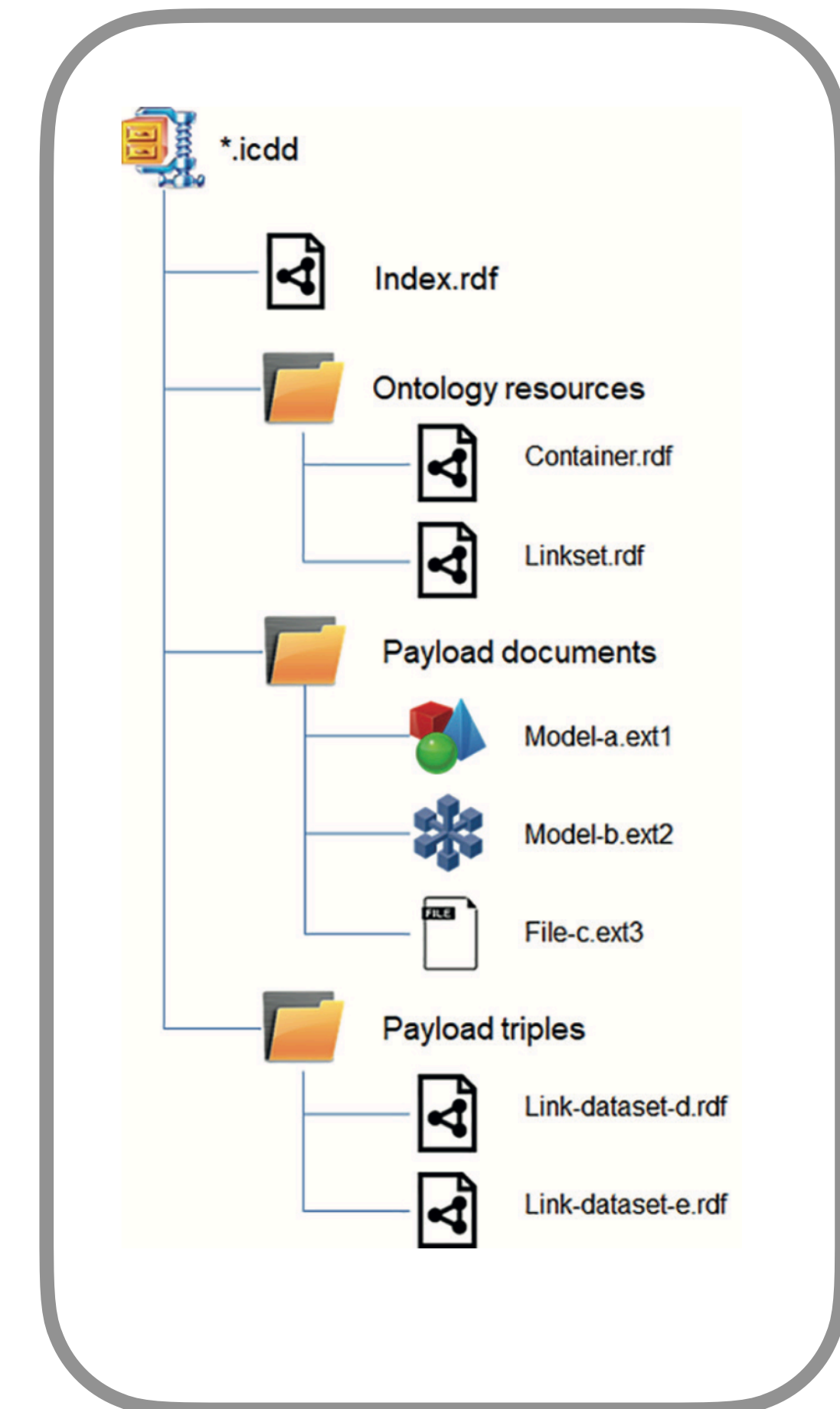
- ▶ Create file structure
- ▶ Include ontologies
- ▶ Add project files

Trivial

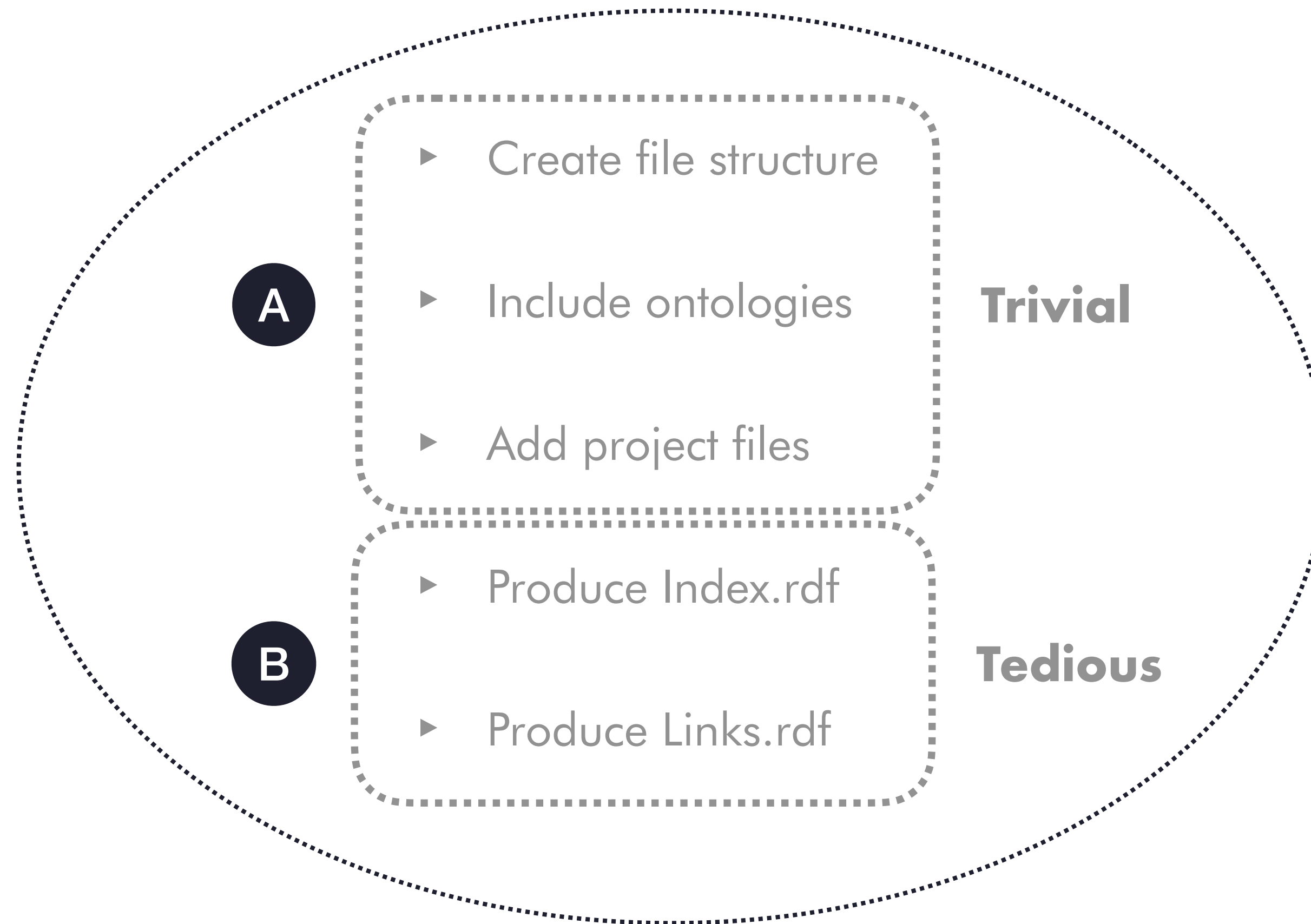
B

- ▶ Produce Index.rdf
- ▶ Produce Links.rdf

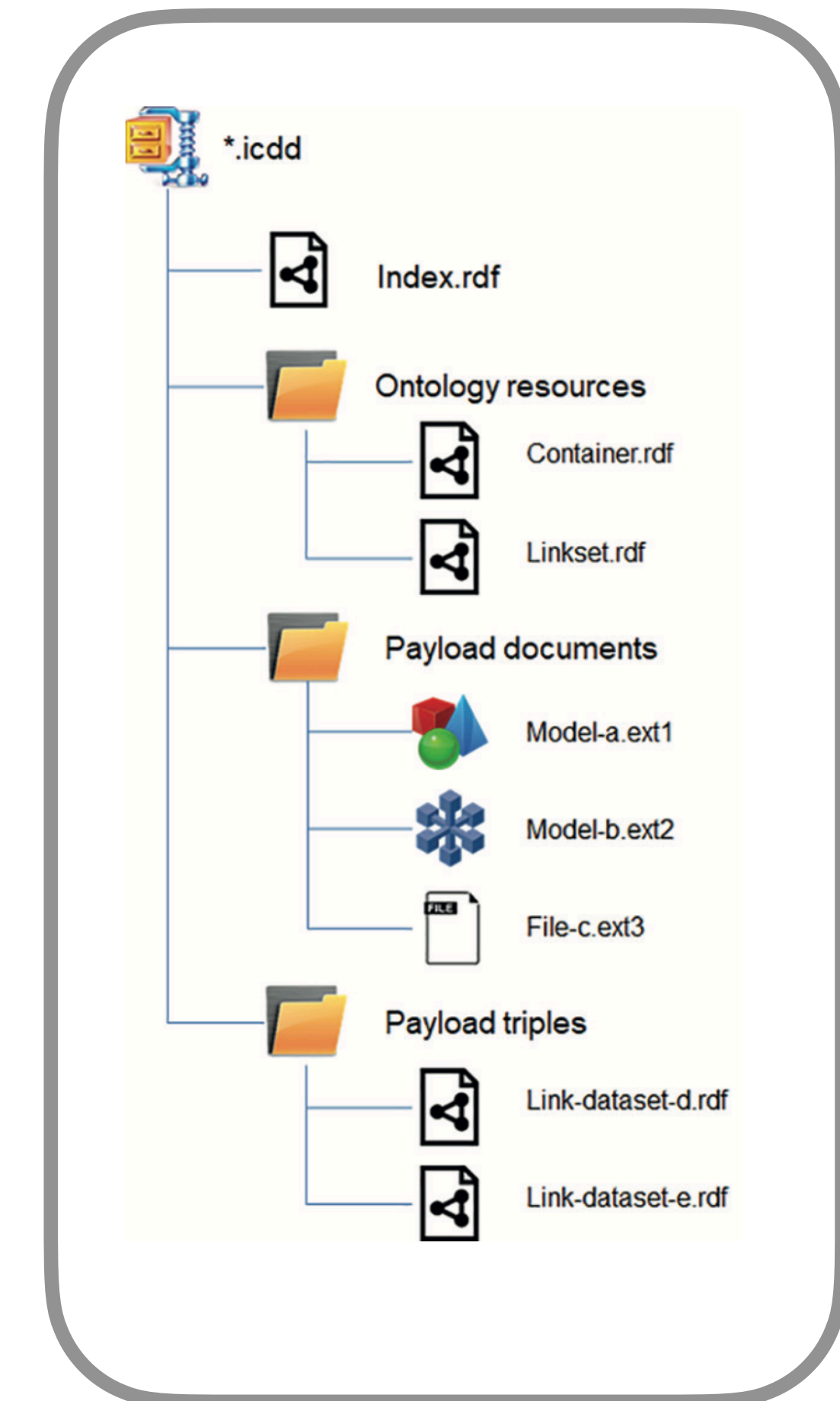
Tedious



Steps required



Framework to simplify this process



A Web-browser interface

HOMEFORM

Container

Version

add number

Publisher

select

ADDITIONAL FIELDS

select

input

Actors

select column

SHOW

HIDE

	type	name	description
x			
x			
x			

+

Documents

select column

SHOW

HIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>				
x	<input type="checkbox"/>				
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Linkset

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add name

select

REMOVE SELECTED

ADDITIONAL FIELDS

<>

A Web-browser interface | Select Input Folder

HOMEFORM

Container

Version

add number

Publisher

select

ADDITIONAL FIELDS

select

input

Actors

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Project_Dir

damagedConcrete.jpg

InspectionReport.xlsx

RustedRailing.jpg

sub1

sub2

TimeSheet.xlsx

Viaduct_48D-100.ifc

name

description

select column

SHOW

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Documents

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Linkset

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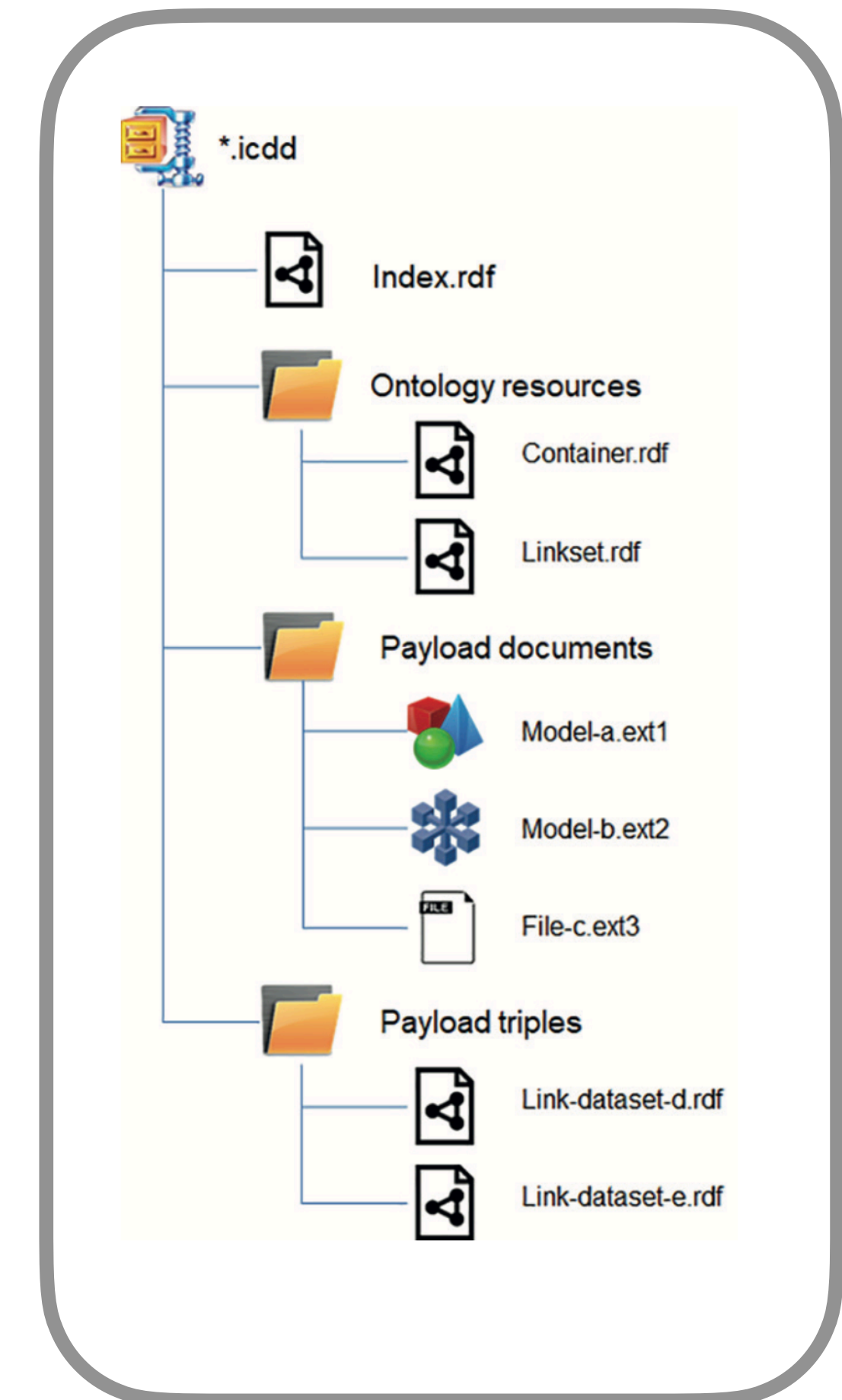
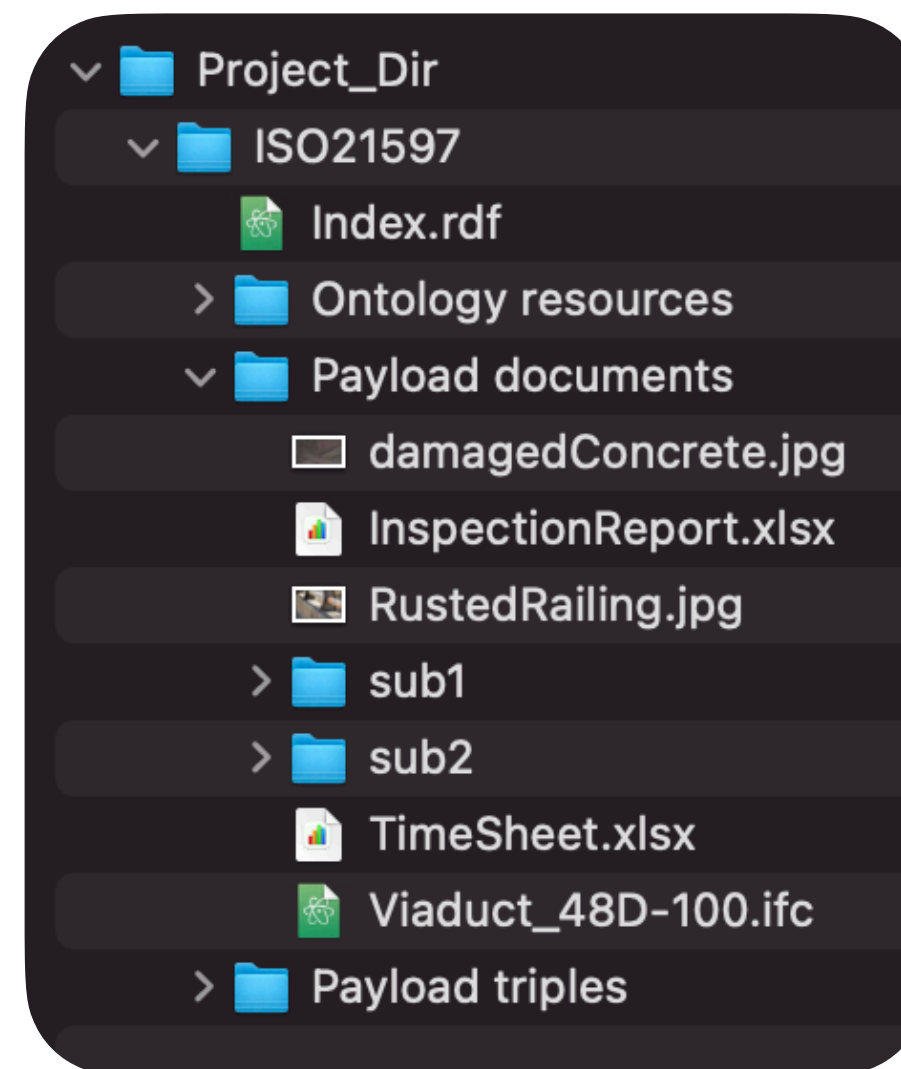
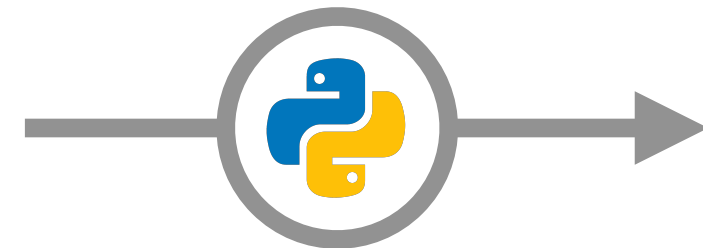
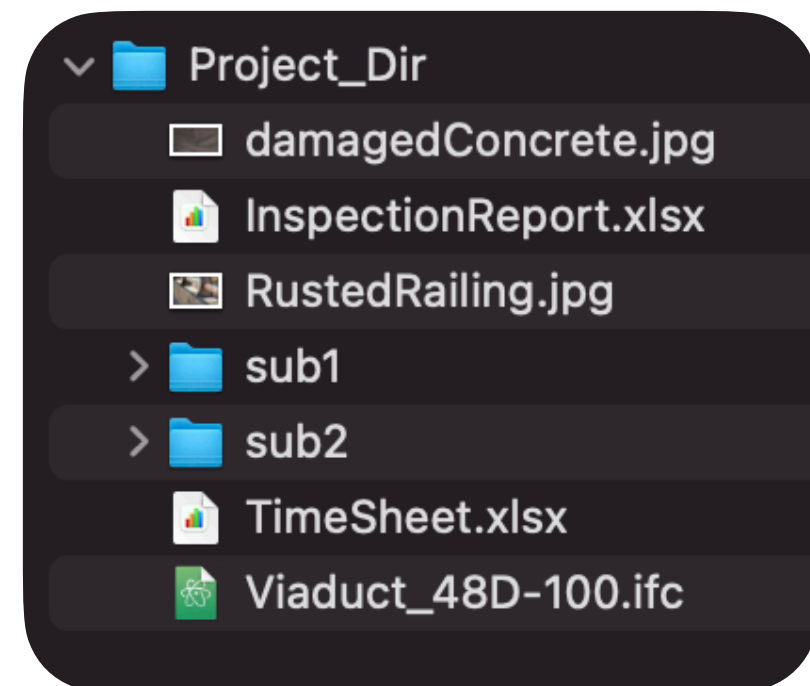
REMOVE SELECTED

ADDITIONAL FIELDS

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A API | Creating ICDD structure & Extracting Metadata



A Web-browser interface

HOMEFORM

Container

Version

add number

Publisher

select

ADDITIONAL FIELDS

select

input

Actors

select column

SHOW

HIDE

	type	name	description
x			
x			
x			

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Documents

select column

SHOW

HIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc		
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx		
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx		
x	<input type="checkbox"/>	InternalDocument	damagedConcrete.jpg		
x	<input type="checkbox"/>				
x	<input type="checkbox"/>				

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Linkset

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add name

select

REMOVE SELECTED

ADDITIONAL FIELDS

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Parsed documents

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B Web-browser interface | Adding Information

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select columnSHOWHIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select columnSHOWHIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

<<<1/2>>>

Linkset

add name

select

REMOVE SELECTED

ADDITIONAL FIELDS

Adding index information

AMBERG GROUP

B Web-browser interface | Adding Information

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select column

SHOWHIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select column

SHOWHIDE

		type	filename	createdBy	
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

url

name

requested

modifiedBy

alternativeDocument

checksum

Linkset

add name

select

REMOVE SELECTED

ADDITIONAL FIELDS

Additional options

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B Web-browser interface | Creating Linksets

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select column

SHOW

HIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select column

SHOW

HIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

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Linkset

add name

Floors

REMOVE SELECTED

ADDITIONAL FIELDS

Creating a linkset

B Web-browser interface | Creating Links

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select column

SHOW

HIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select column

SHOW

HIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

<<<1/2>>>

Linkset

add name

Floors

REMOVE SELECTED

ADDITIONAL FIELDS

add name

2

REMOVE SELECTED

ADDITIONAL FIELDS

Link

Adding a link

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B Web-browser interface | Linking Elements

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select column

SHOW

HIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select column

SHOW

HIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input checked="" type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input checked="" type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

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Linkset

add name

Floors

REMOVE SELECTED

ADDITIONAL FIELDS

Link

add name

2

REMOVE SELECTED

ADDITIONAL FIELDS

Link Elements

select column

SHOW

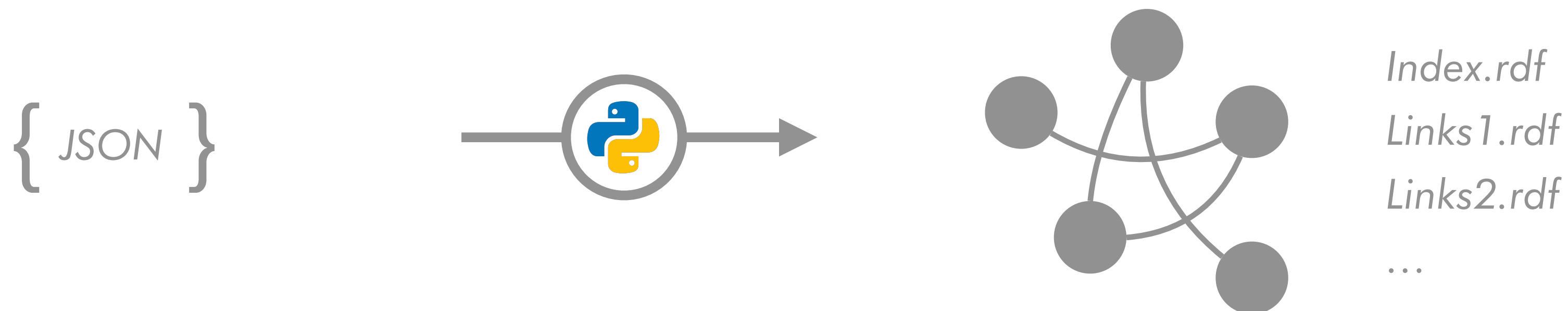
HIDE

	name	identifier
x	damagedConcrete.jpg	
x	http://example.org/somefile.txt	43

Including elements in the selected link

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B API | Producing RDF files



```
<?xml version="1.0" encoding="utf-8"?>
<rdf:RDF xml:base="http://
  xmlns:ls="https://standards.iso.org/iso/21597/-1/ed-1/en/Linkset#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:ct="https://standards.iso.org/iso/21597/-1/ed-1/en/Container#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
>
  <ls:Link rdf:about="#03286d15-8e64-4ad7-9f17-969c5b909c67">
    <ls:hasLinkElement>
      <ls:LinkElement rdf:about="#53bc20ce-d312-437f-aa86-a029018ae987">
        <ls:hasDocument rdf:resource="http://
          #17021372-0cf2-4c40-b0ec-334d85900f32"/>
        <ct:createdBy rdf:resource="http://
          #81b2cdc4-a89e-4279-8ea9-fc1b9b6867d1"/>
        <ct:creationDate rdf:datatype="dateTime">2021-07-28T11:33:49.714171</ct:creationDate>
      </ls:LinkElement>
    </ls:hasLinkElement>
    <ls:LinkElement rdf:about="#4e87dc8a-42ea-468f-b5c8-c269858e18aa">
      <ct:createdBy rdf:resource="http://
        #81b2cdc4-a89e-4279-8ea9-fc1b9b6867d1"/>
      <ls:hasDocument rdf:resource="http://
        #51f25c90-2e99-45ce-85bc-47e4ab475418"/>
      <ct:creationDate rdf:datatype="dateTime">2021-07-28T11:33:49.714341</ct:creationDate>
    </ls:LinkElement>
    </ls:hasLinkElement>
    <ls:hasLinkElement>
      <ls:LinkElement rdf:about="#d4a25177-0777-4c9a-8805-5e1ca0c8e954">
        <ct:createdBy rdf:resource="http://
          #81b2cdc4-a89e-4279-8ea9-fc1b9b6867d1"/>
        <ls:hasDocument rdf:resource="http://
          #941fc126-7735-4833-82bc-5d6277ec8f67"/>
        <ct:creationDate rdf:datatype="dateTime">2021-07-28T11:33:49.714621</ct:creationDate>
      </ls:LinkElement>
    </ls:hasLinkElement>
    <ls:hasLinkElement>
      <ls:LinkElement rdf:about="#0fd5e4b7-6c1c-4607-bcc0-391d080e55ab">
        <ls:hasDocument rdf:resource="http://
          #47934bca-3dff-465d-822b-464a9aef58c5"/>
        <ct:createdBy rdf:resource="http://
          #81b2cdc4-a89e-4279-8ea9-fc1b9b6867d1"/>
        <ct:creationDate rdf:datatype="dateTime">2021-07-28T11:33:49.714204</ct:creationDate>
      </ls:LinkElement>
    </ls:hasLinkElement>
    <ls:hasLinkElement>
      <ls:LinkElement rdf:about="#cf632fb7-12fa-457b-9516-f138e2a6d7a5">
        <ls:hasDocument rdf:resource="http://
          #065b23c8-5a22-4061-a8e9-8e21e6b4667b"/>
        <ct:createdBy rdf:resource="http://
          #81b2cdc4-a89e-4279-8ea9-fc1b9b6867d1"/>
        <ct:creationDate rdf:datatype="dateTime">2021-07-28T11:33:49.714671</ct:creationDate>
      </ls:LinkElement>
    </ls:hasLinkElement>
  </ls:Link>
</rdf:RDF>
```

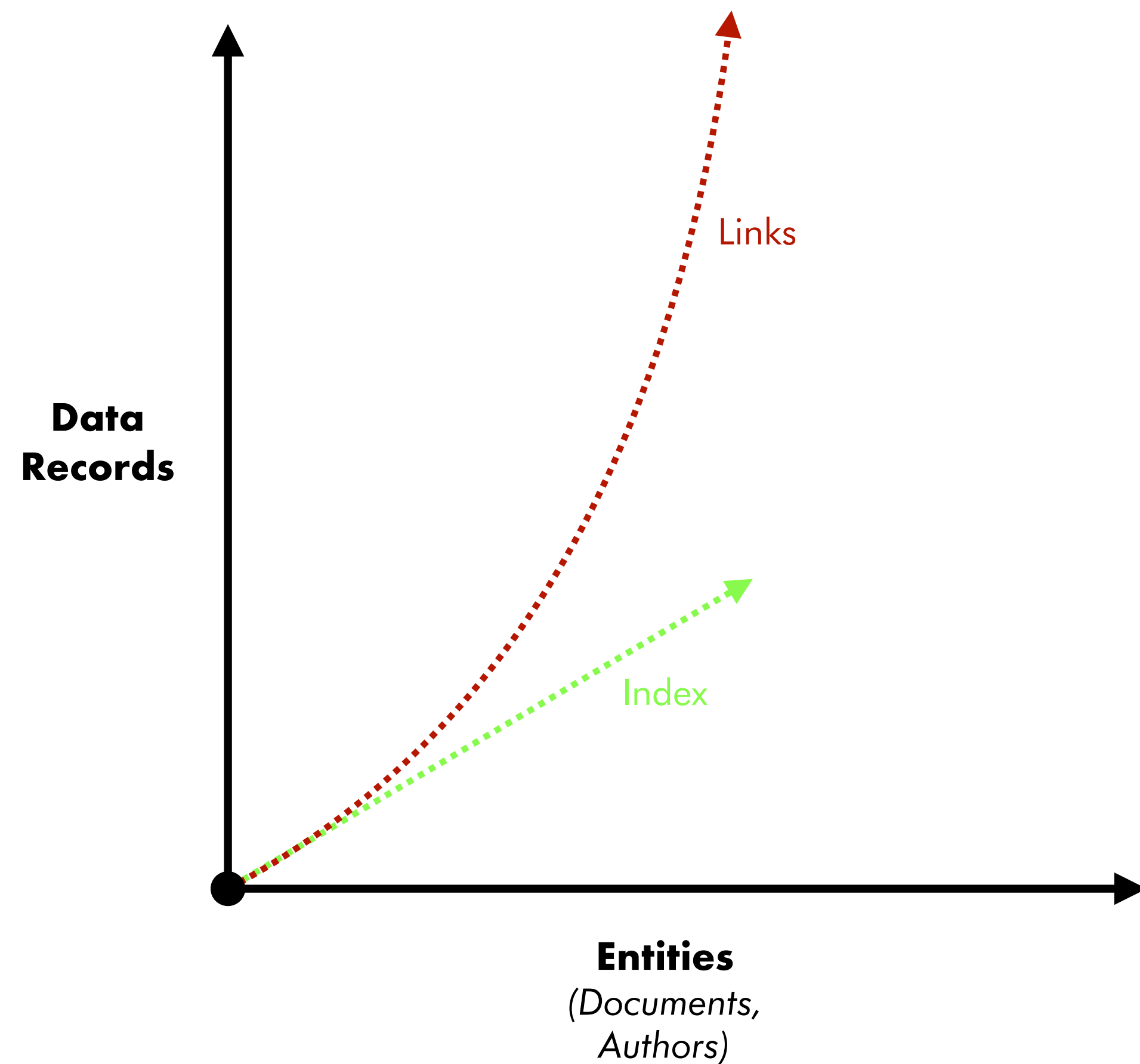
```
<?xml version="1.0" encoding="utf-8"?>
<rdf:RDF xml:base="http://
xmlns:ct="https://standards.iso.org/iso/21597/-1/ed-1/en/Container#"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:owl="http://www.w3.org/2002/07/owl#"
>
<ct:ContainerDescription rdf:about="#b8a87875-f064-4a06-9898-dc82de57267e">
  <ct:containsDocument>
    <ct:InternalDocument rdf:about="#52ca53cb-c488-41ea-8bc2-33837b79c1eb">
      <ct:filetype rdf:datatype="string">pdf</ct:filetype>
      <ct:name rdf:datatype="string">01205027.pdf</ct:name>
      <ct:description rdf:datatype="string">
      <ct:createdBy rdf:resource="#a083c452-d2e2-408d-aa51-ee07bc94e86a"/>
    </ct:InternalDocument>
  </ct:containsDocument>
  <ct:containsDocument>
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      <ct:createdBy rdf:resource="#a083c452-d2e2-408d-aa51-ee07bc94e86a"/>
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      <ct:description rdf:datatype="string">
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    </ct:InternalDocument>
  </ct:containsDocument>
  <ct:containsDocument>
    <ct:InternalDocument rdf:about="#a7e30c8b-3bfc-41da-84d0-7c85d1a4faba">
      <ct:createdBy rdf:resource="#a083c452-d2e2-408d-aa51-ee07bc94e86a"/>
      <ct:description rdf:datatype="string">
      <ct:filetype rdf:datatype="string">pdf</ct:filetype>
      <ct:name rdf:datatype="string">82141-03.pdf</ct:name>
    </ct:InternalDocument>
  </ct:containsDocument>
  <ct:containsDocument>
    <ct:InternalDocument rdf:about="#0c86edef-198a-40eb-a6c1-25fb4a08793d">
      <ct:description rdf:datatype="string">
      <ct:filetype rdf:datatype="string">pdf</ct:filetype>
      <ct:createdBy rdf:resource="#a083c452-d2e2-408d-aa51-ee07bc94e86a"/>
      <ct:name rdf:datatype="string">8314-04A.pdf</ct:name>
    </ct:InternalDocument>
  </ct:containsDocument>

```


B+ Challenge in scaling data linking processes

What about really large projects?

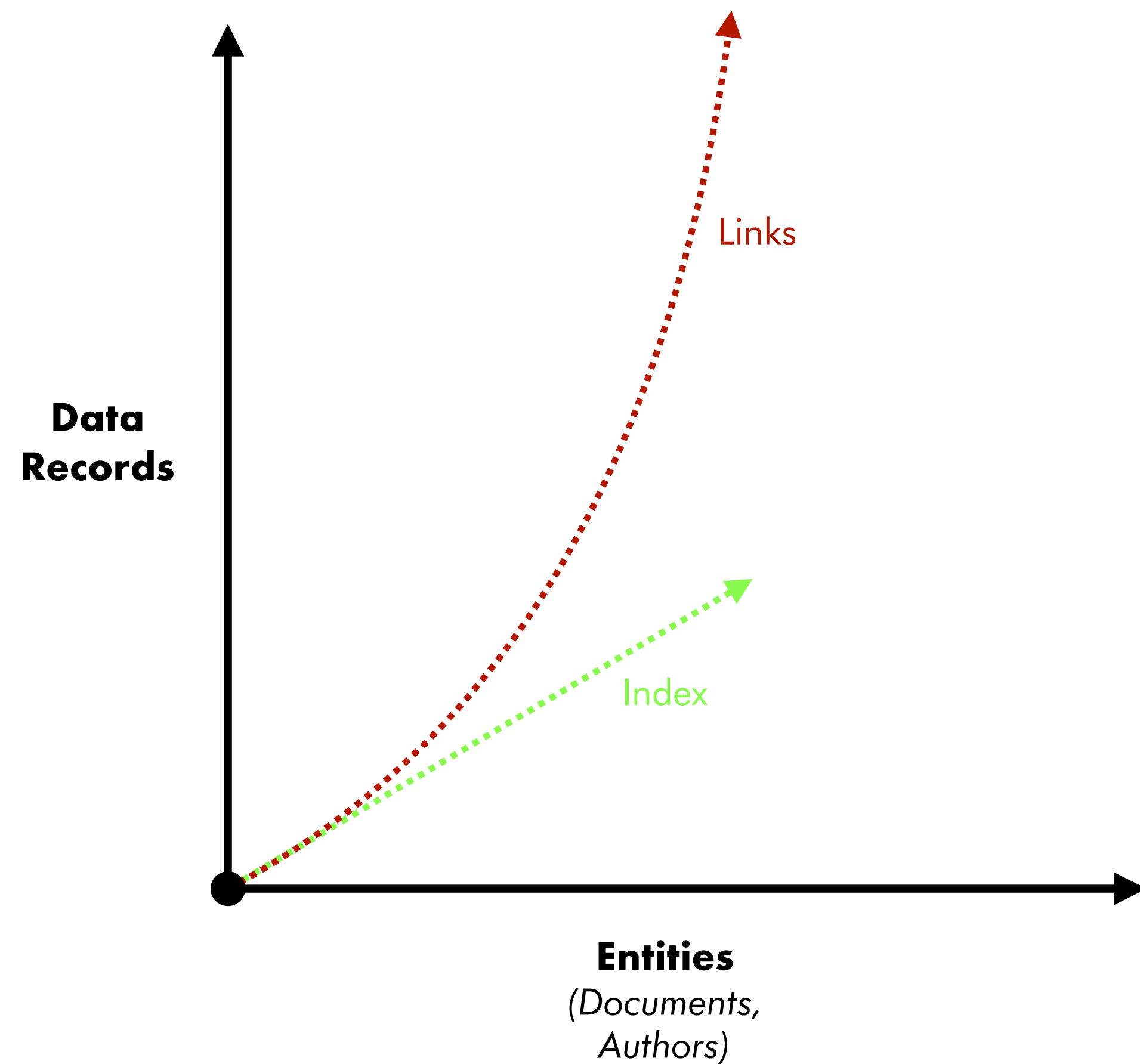
B+ Challenge in scaling data linking processes



What about really large projects?

In projects with an increased amount of documents a bulk data processing approach is necessary to **make the linking process efficient**.

B+ Challenge in scaling data linking processes



What about really large projects?

In projects with an increased amount of documents a bulk data processing approach is necessary to **make the linking process efficient**.

...we need to be able to **SCALE!**

B+

Automating **Link Extraction** : *Example*

Name	Anfang	Ende
B05-OG01-BODEN-Sanitärbereich-Nord_Hohlraumboden schliessen E3	12 Mai 2021 08:00	19 Mai 2021 17:00
B05-OG01-TÜREN-Sanitärbereich-Nord_WC Trennwände E3	20 Mai 2021 08:00	27 Mai 2021 17:00
B05-OG01-FLIESENARBEITEN-Sanitärbereich-Nord_Fliesen legen E3	28 Mai 2021 08:00	17 Juni 2021 17:00
B05-OG01-DECKE-Sanitärbereich-Nord_Abgehängte Decke E3	18 Juni 2021 08:00	01 Juli 2021 17:00
B05-OG01-TÜREN-Sanitärbereich-Nord_Türen montieren E3	16 Juli 2021 08:00	22 Juli 2021 17:00
B05-OG01-MALER-EMSR-R._Bodenanstrich staubbbindend E3	29 März 2021 08:00	06 April 2021 17:00
B05-OG01-BODEN-EMSR-R._Achsen spicken E3	07 April 2021 08:00	13 April 2021 17:00
B05-OG01-DOPPELBODEN-EMSR-R._Doppelboden installieren E3	28 April 2021 08:00	11 Mai 2021 17:00
B05-OG01-DOPPELBODEN-EMSR-R._Rahmen für Schaltschränke E3	28 April 2021 08:00	11 Mai 2021 17:00
B05-OG01-TÜREN-EMSR-R._Türen montieren E3	12 Mai 2021 08:00	19 Mai 2021 17:00
B05-OG01-GIPSER-Büro-Nord_Schächte - Wände schliessen E3	20 Juli 2021 08:00	26 Juli 2021 17:00
B05-OG01-GIPSER-Büro-Nord_Bodenschotts E3	20 Juli 2021 08:00	02 August 2021 17:00
B05-OG01-GIPSER-Büro-Nord_Wände schliessen E3	20 Juli 2021 08:00	02 August 2021 17:00
B05-OG01-MALER-Büro-Nord_Bodenanstrich staubbbindend E3	03 August 2021 08:00	09 August 2021 17:00
B05-OG01-BODEN-Büro-Nord_Achsen spicken E3	10 August 2021 08:00	16 August 2021 17:00
B05-OG01-BODEN-Büro-Nord_Hohlraumboden schliessen E3	21 September 2021 08:00	18 Oktober 2021 17:00
B05-OG01-SCHREINER-Büro-Nord_Einbauschränke einbauen E3	19 Oktober 2021 08:00	25 Oktober 2021 17:00
B05-OG01-BODEN-Büro-Nord_Doppelboden mit Teppich schliessen E3	21 September 2021 08:00	18 Oktober 2021 17:00
B05-OG01-SYSTEMTRENNWÄNDE-Büro-Nord_Glaswände stellen E3	19 Oktober 2021 08:00	15 November 2021 17:00
B05-OG01-SCHREINER-Büro-Nord_Holzverkleidung/-wände E3	09 November 2021 08:00	06 Dezember 2021 17:00
B05-OG01-MALER-Büro-Nord_Grund- und Zwischenanstrich E3	30 November 2021 08:00	13 Dezember 2021 17:00
B05-OG01-DECKE-Büro-Nord_Montage abgehängte Decken E3	14 Dezember 2021 08:00	18 Januar 2022 17:00
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B05-OG01-TÜREN-Büro-Nord_Türen montieren E3	10 März 2022 08:00	23 März 2022 17:00
B05-OG01-VORHÄNGE-Büro-Nord_Vorhänge anbringen E3	10 März 2022 08:00	23 März 2022 17:00
B05-OG01-TROCKENBAU-Sanitärbereich-Süd_Wände schliessen E3	14 April 2021 08:00	27 April 2021 17:00
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B05-OG01-BODEN-Sanitärbereich-Süd_Hohlraumboden schliessen E3	12 Mai 2021 08:00	19 Mai 2021 17:00
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Construction schedule

in MS-Project

~10000 tasks

B+

Automating **Link Extraction** : *Example*

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Construction schedule in MS-Project

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The necessary information is included in the task names, which follow an **irregular** and **dynamic** naming convention

B+ Automating **Link Extraction** : *Example*

We approach it as a **Named Entity Recognition** (NER) problem

B+ Automating **Link Extraction** : *Example*

We approach it as a **Named Entity Recognition** (NER) problem*

**Identifying word instances that belong to certain given classes*

To further elaborate on the geographical trends, **North America** LOC has procured **more than 50%** PERCENT of the global share in **2017** DATE and has been leading the regional landscape of **AI** GPE in the retail market. The **U.S.** GPE has a significant credit in the regional trends with **over 65%** PERCENT of investments (including M&As, private equity, and venture capital) in artificial intelligence technology. Additionally, the region is a huge hub for startups in tandem with the presence of tech titans, such as **Google** ORG, **IBM** ORG, and **Microsoft** ORG.

B+ Automating **Link Extraction** : *Example*

We approach it as a **Named Entity Recognition** (NER) problem

Challenge: lots.. but not huge amounts of data

B+ Automating **Link Extraction** : *Example*

We approach it as a **Named Entity Recognition** (NER) problem

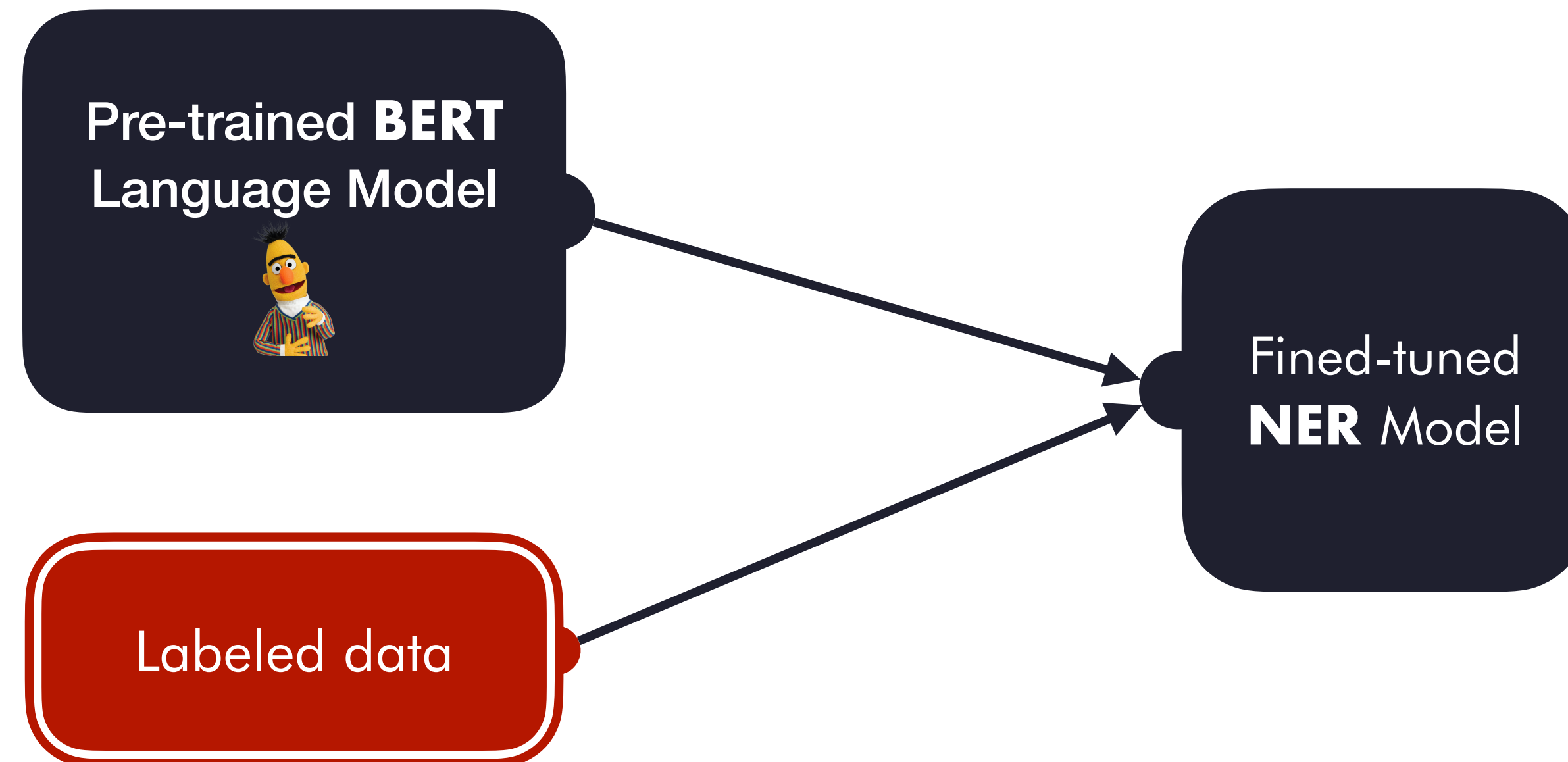
Challenge: lots.. but not huge amounts of data

Transfer Learning

Language Models: Unsupervised pre-trained Neural Networks that can be fined-tuned towards specific NLP tasks (eg NER) with small labeled datasets.

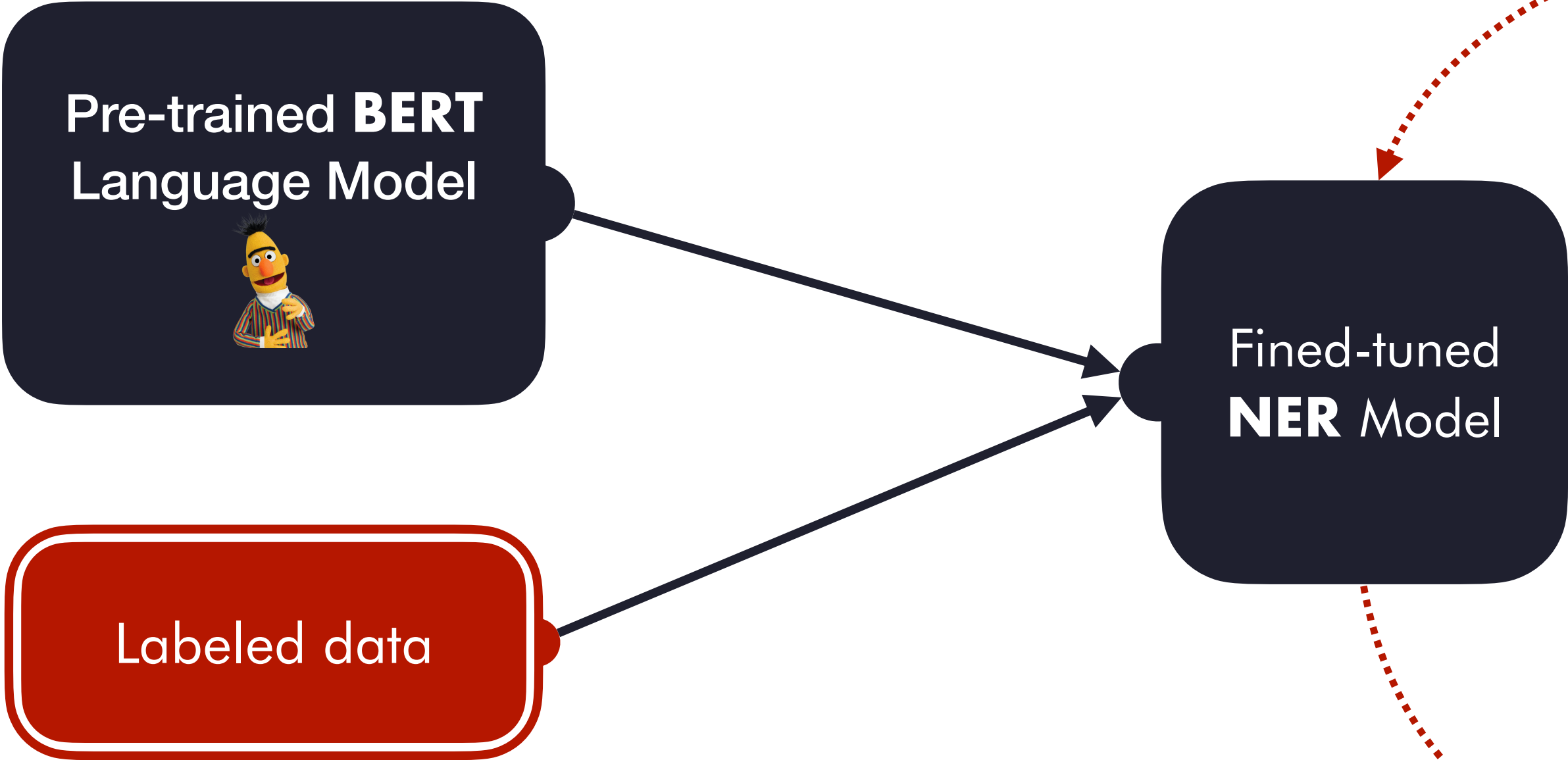
B+ Automating **Link Extraction** : *Example*

Fine-tuned **NER** model to detect desired information in “Task” strings



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Fine-tuned **NER** model to detect desired information in “Task” strings

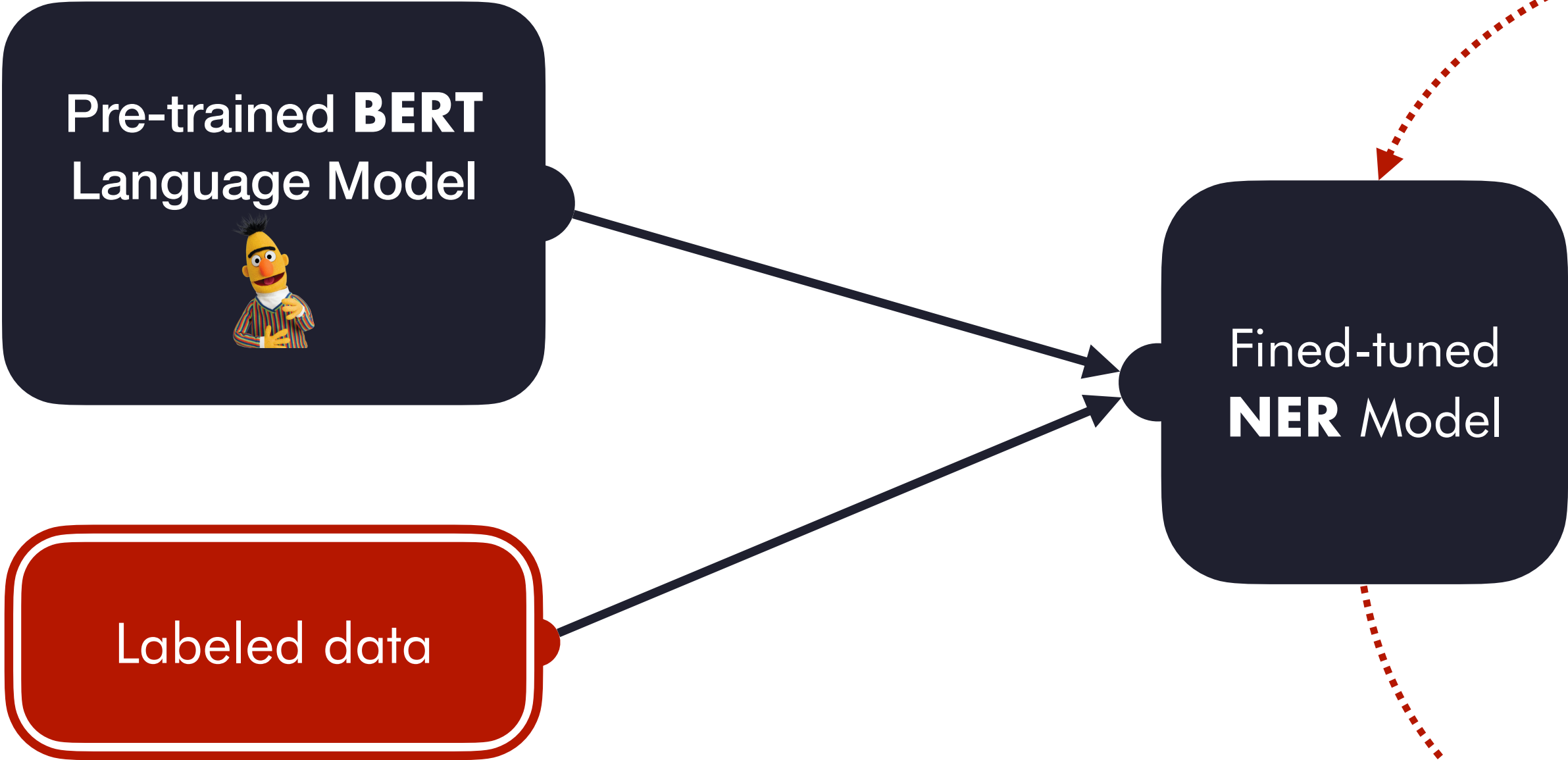


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Building B05
Floor OG01
Zone Büro-Nord
Discipline BODEN
Layer E3

B+ Automating **Link Extraction** : *Example*

Fine-tuned **NER** model to detect desired information in “Task” strings



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LinkElement

Linksets	Links
Building	B05
Floor	OG01
Zone	Büro-Nord
Discipline	BODEN
Layer	E3

B+ Automating **Link Extraction** : *Example*

Monitoring extracted links and making adjustments using the interface

HOMEFORM

Container

Version0.01

PublisherJohn Doe

ADDITIONAL FIELDS

descriptionfirst version

Actors

select columnSHOWHIDE

	type	name	description
x	Organisation	Amberg Group	
x	Person	John Doe	Project Manager
x	Organisation	Client X	
x			

Documents

select columnSHOWHIDE

		type	filename	createdBy	description
x	<input type="checkbox"/>	InternalDocument	Viaduct_48D-100.ifc	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	InspectionReport.xlsx	Amberg Group	
x	<input type="checkbox"/>	InternalDocument	TimeSheet.xlsx	John Doe	
x	<input checked="" type="checkbox"/>	InternalDocument	damagedConcrete.jpg	Client X	Needs attention
x	<input checked="" type="checkbox"/>	ExternalDocument	http://example.org/somefile.txt	Client X	
x	<input type="checkbox"/>				

Linkset

add name

Floors

REMOVE SELECTED

ADDITIONAL FIELDS

Link

add name

2

REMOVE SELECTED

ADDITIONAL FIELDS

Link Elements

select columnSHOWHIDE

	name	identifier
x	damagedConcrete.jpg	
x	http://example.org/somefile.txt	43

B05-OG01-BODEN-Büro-Nord_Hohlraumboden schliessen E3
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B05-OG01-TÜREN-Büro-Nord_Türen montieren E3
B05-OG01-VORHÄNGE-Büro-Nord_Vorhänge anbringen E3
B05-OG01-TROCKENBAU-Sanitärbereich-Süd_Wände schliessen E3
B05-OG01-MALER-Sanitärbereich-Süd_Bodenanstrich staubbindend E3
B05-OG01-BODEN-Sanitärbereich-Süd_Achsen spicken E3
B05-OG01-BODEN-Sanitärbereich-Süd_Hohlraumboden schliessen E3
B05-OG01-TÜREN-Sanitärbereich-Süd_WC Trennwände E3
B05-OG01-FLIESENARBEITEN-Sanitärbereich-Süd_Fliesen legen E3
B05-OG01-DECKE-Sanitärbereich-Süd_Abgehängte Decke E3
B05-OG01-TÜREN-Sanitärbereich-Süd_Türen montieren E3
B05-OG01-MALER-Safety-Raum_Bodenanstrich staubbindend E3
B05-OG01-BODEN-Safety-Raum_Achsen spicken E3
B05-OG01-DOPPELBODEN-Safety-Raum_Doppelboden installieren E3
B05-OG01-DOPPELBODEN-Safety-Raum_Rahmen für Schaltschränke E3

LinksetsLinks

Building Floor Zone Discipline Layer

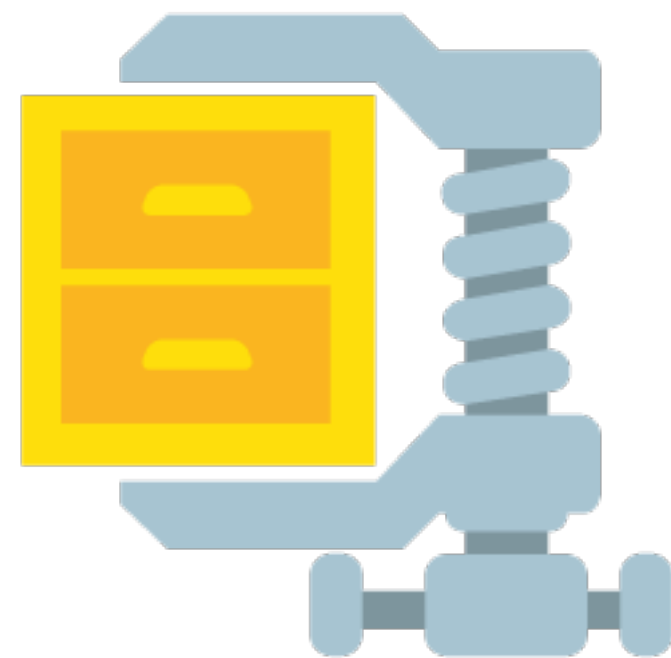
B05
OG01
Büro-Nord
BODEN
E3

AMBERG GROUP

B+ Automating **Link Extraction** : *Various sources*

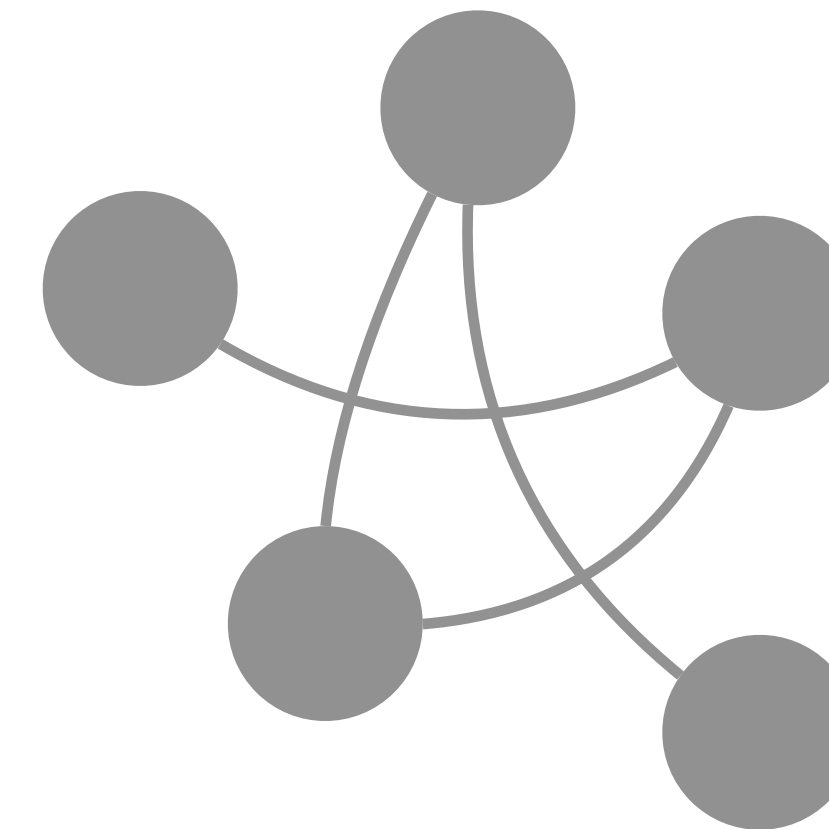
Texts
Spreadsheets
3D Models
Images
Pointclouds
...

The information can be **zipped** into the ISO requested format (.icdd) for **delivery** or **storage**



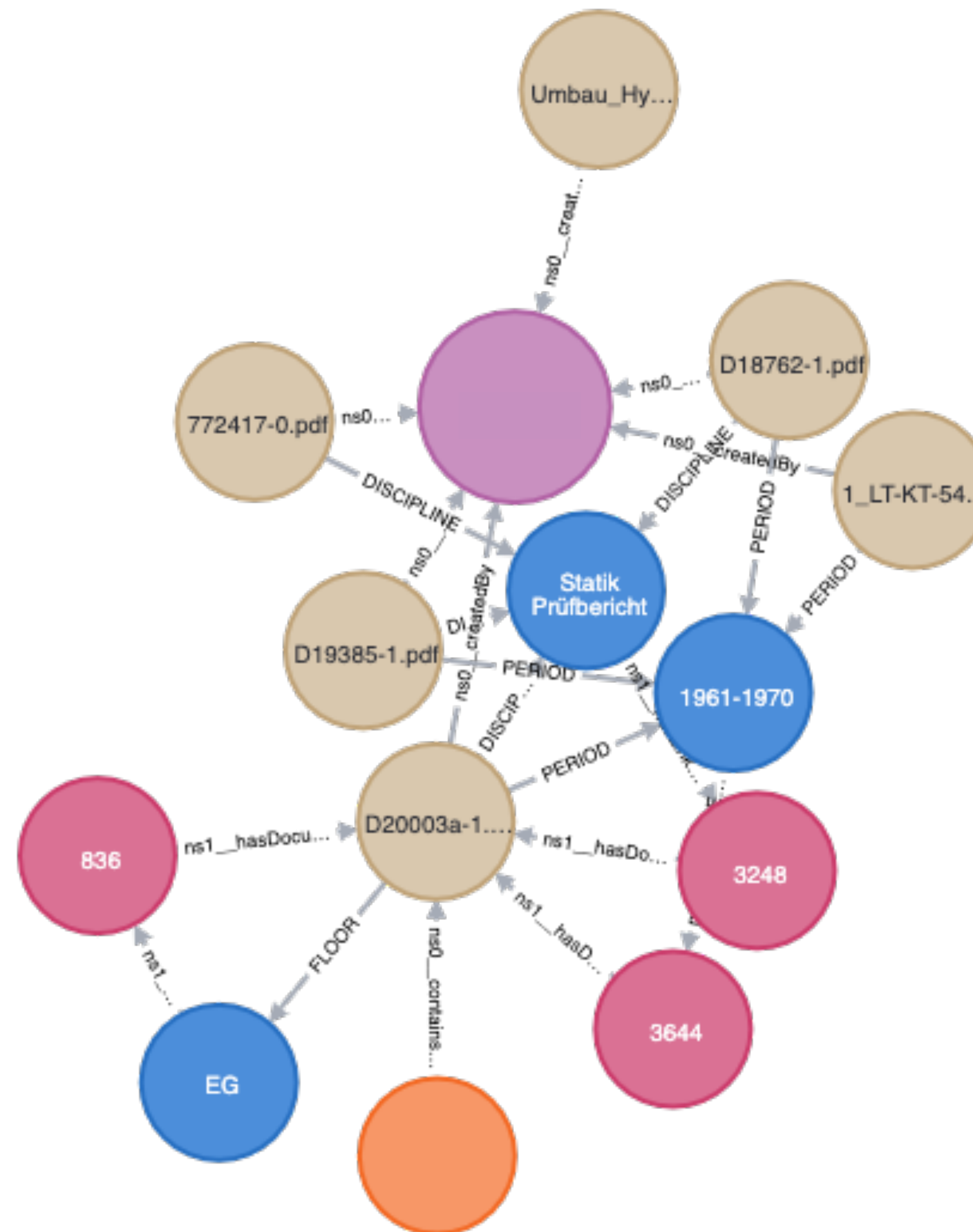
**icdd*

While the **RDF** files can be **composed** to a **connected Graph** and stored in a Graph database



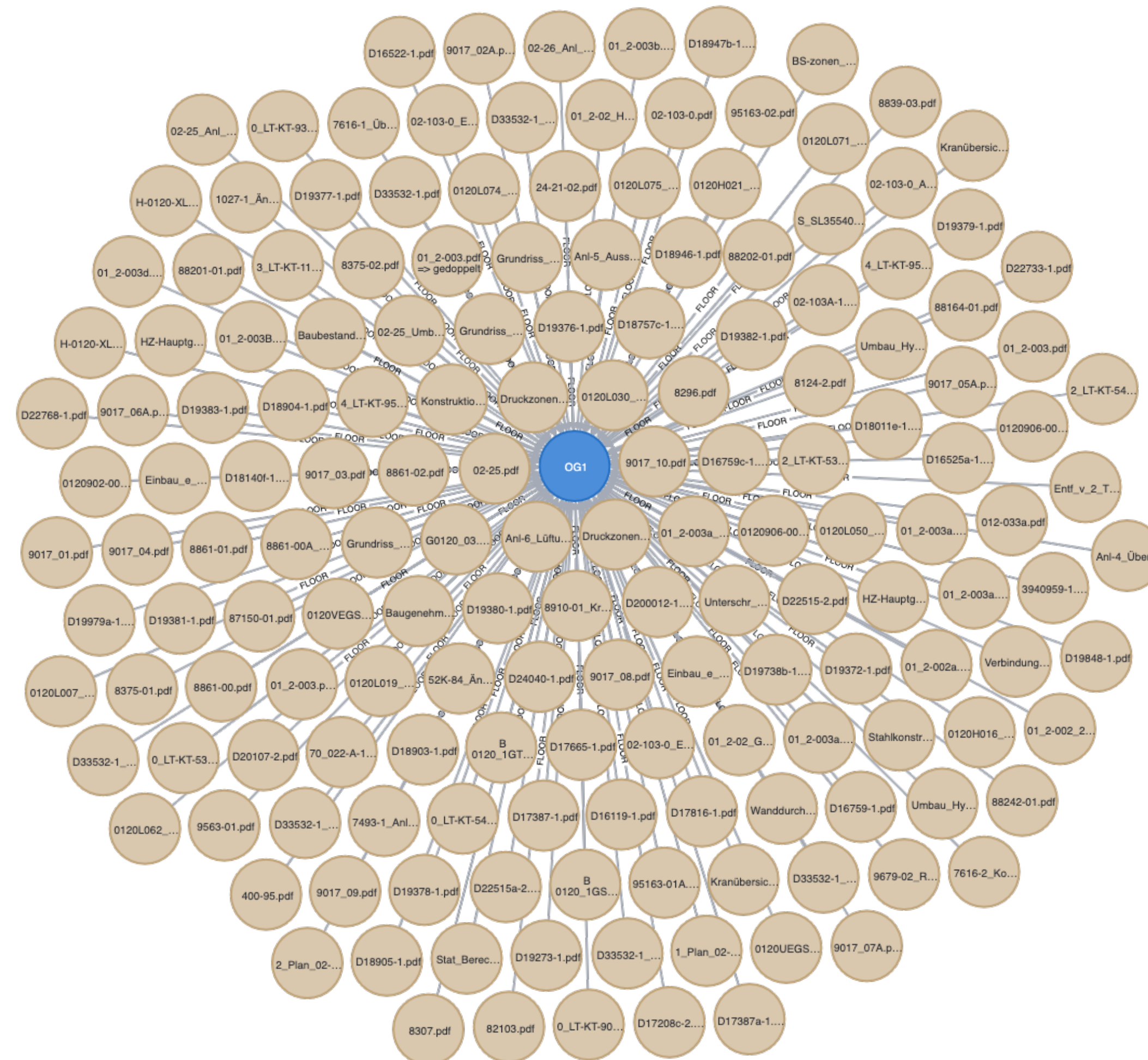
Example

Random snapshot



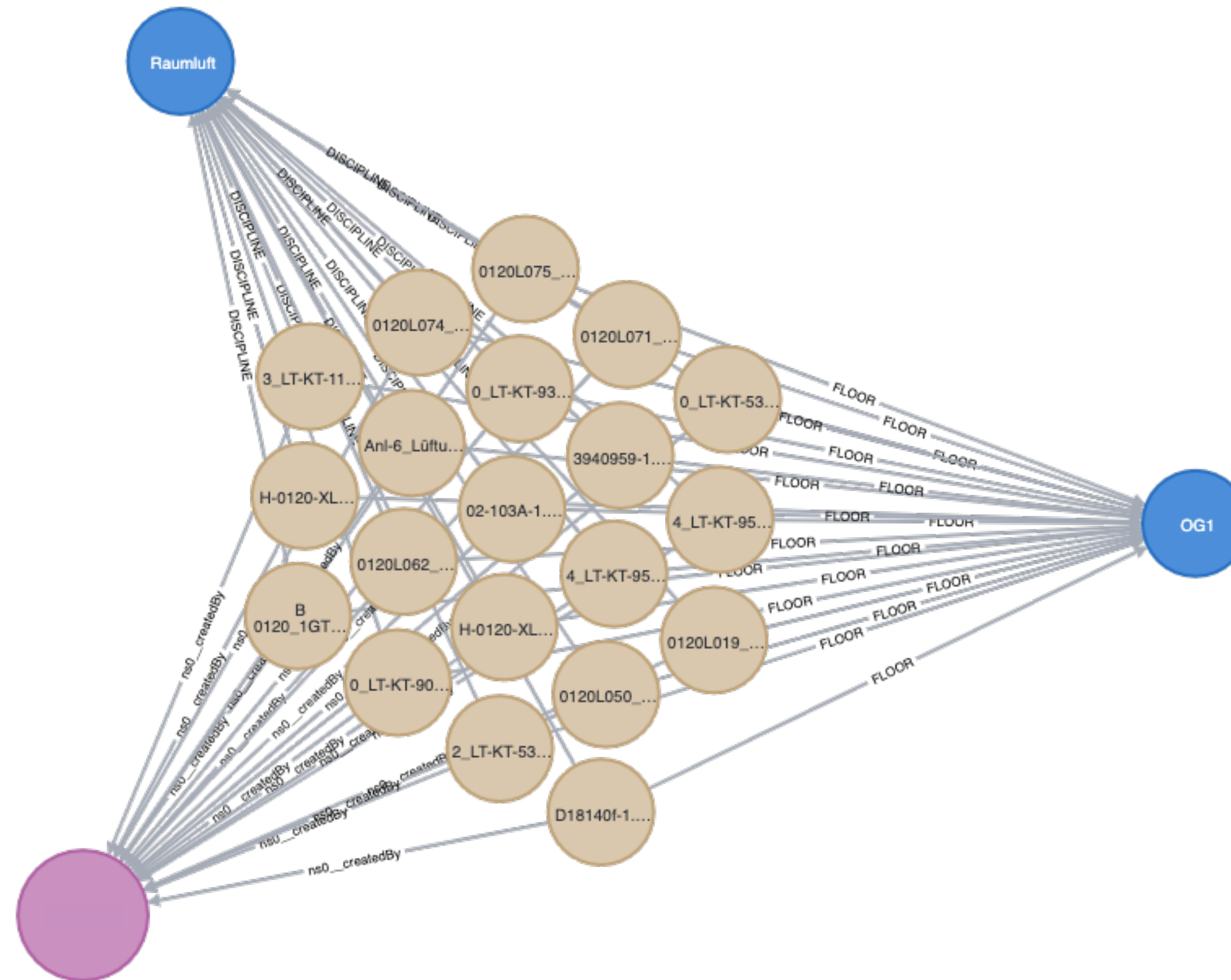
Example

All documents related to floor "OG1"



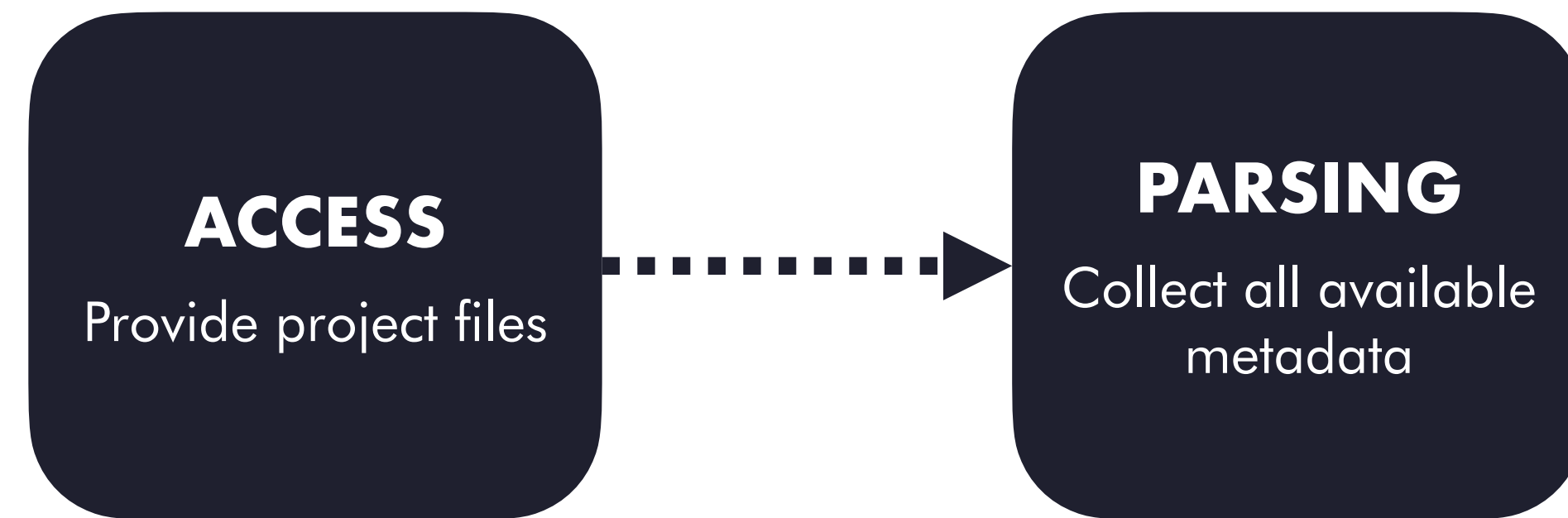
Example

All documents related to floor "OG1" and discipline "Raumluft", created by "Client"

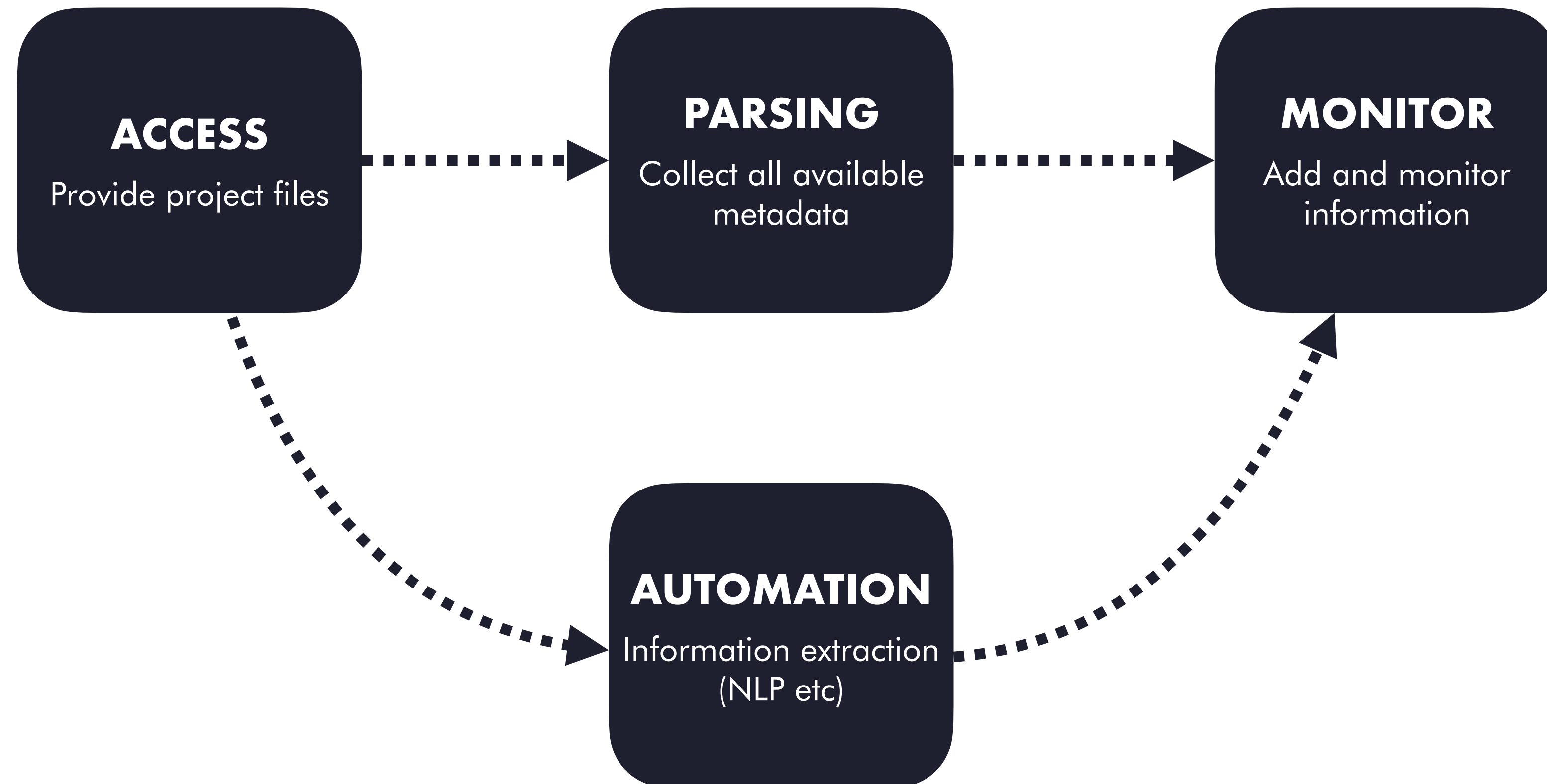


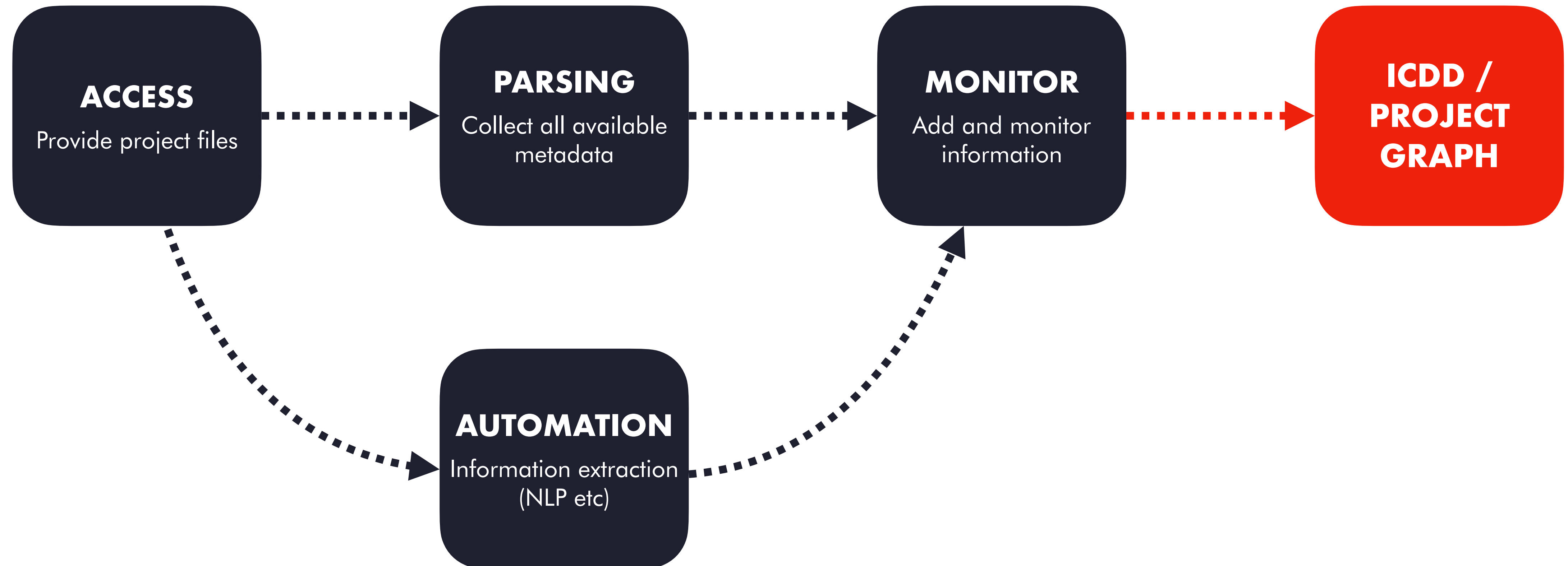
ACCESS

Provide project files









We 're aiming for

- Interoperability
- Future proofing
- Insights

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ICDD (ISO-21597) provides

- Vendor agnostic setup
- Open standards
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Proposed Framework

Making ICDD production:

- **accessible** by simplifying the process
- **scalable** by adding automation

- ▶ Add validation

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- ▶ Enriching the semantics of the *identifier* - Alignment of ICDD with other AECO ontologies like Brick, BOT etc.

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- ▶ Enriching the semantics of the *identifier* - Alignment of ICDD with other AECO ontologies like Brick, BOT etc.
- ▶ Standardise *Link Extraction* processes

Thank you!