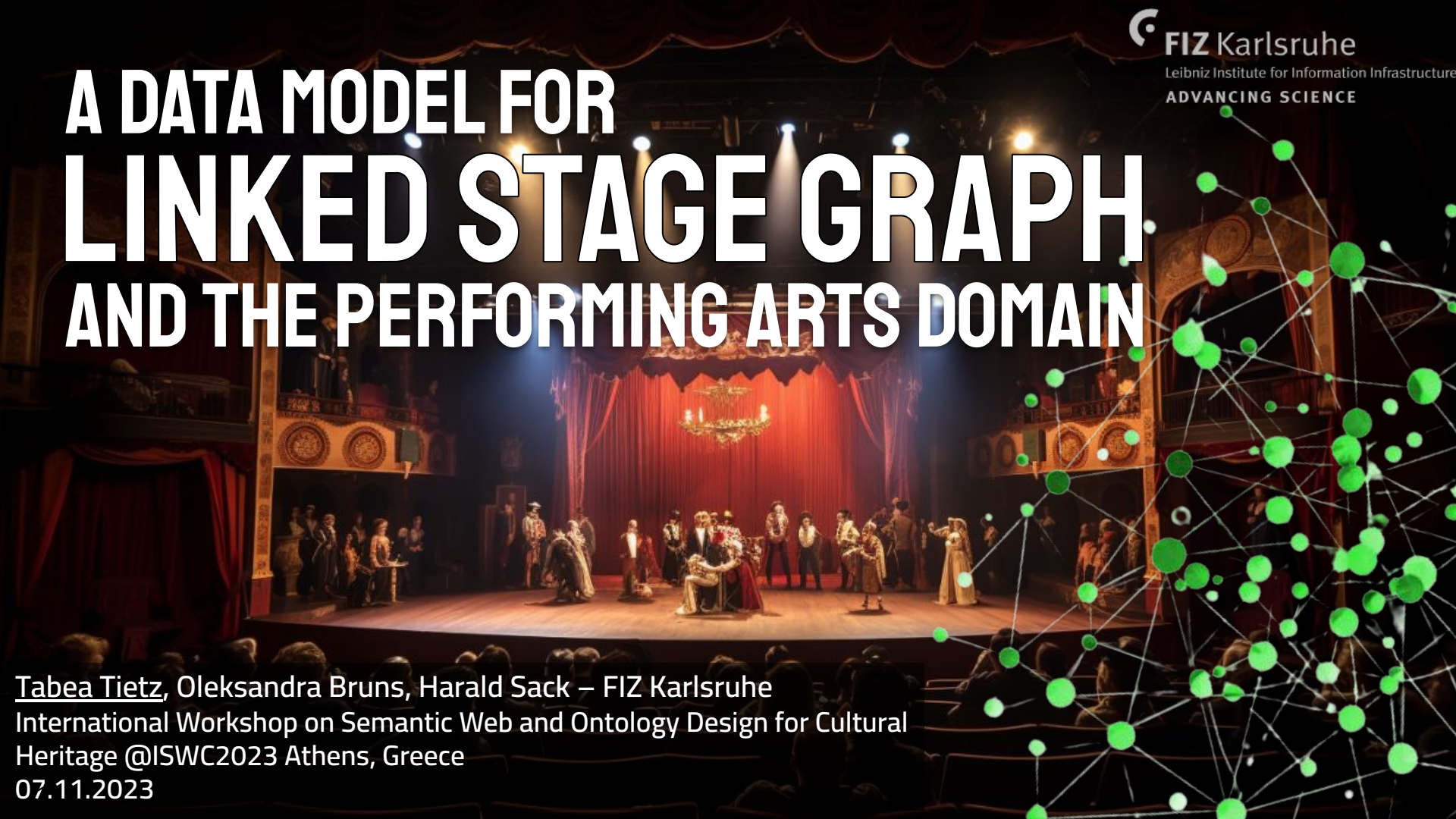

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ADVANCING SCIENCE

A DATA MODEL FOR LINKED STAGE GRAPH AND THE PERFORMING ARTS DOMAIN

Tabea Tietz, Oleksandra Bruns, Harald Sack – FIZ Karlsruhe
International Workshop on Semantic Web and Ontology Design for Cultural Heritage @ISWC2023 Athens, Greece
07.11.2023

THEATRE HISTORY RESEARCH
MOTIVATION

- Theatre is art form and social institution
- Embedded into our societies for thousands of years
- Merges the historic and the modern, reinventing itself time and time again
- Historical plays persist to this day, finding new life through reinterpretation on modern stages.

THEATRE HISTORY RESEARCH
MOTIVATION

- Theatre never exists in isolation and is always embedded in the context of the respective culture and society.
- Shaped by societal and political events or by technological advancements
- Influence creative possibilities and limitations on stage.

THEATRE HISTORY RESEARCH
MOTIVATION

RESEARCH

- Which theatres produced the works of Bertolt Brecht during the late 1920s?
- Which actors were on stage during WWII in Germany?
- Which playwrights are most interpreted on modern stages?

[1,2,3]

THEATRE HISTORY RESEARCH PROBLEM

- KGs are often used to represent historical theatre data, but
  - platforms are often closed
  - Data models and ontologies are often not shared
- Proprietary software
- Barriers impeding the discoverability, accessibility, interoperability, and reusability of performing arts research data.

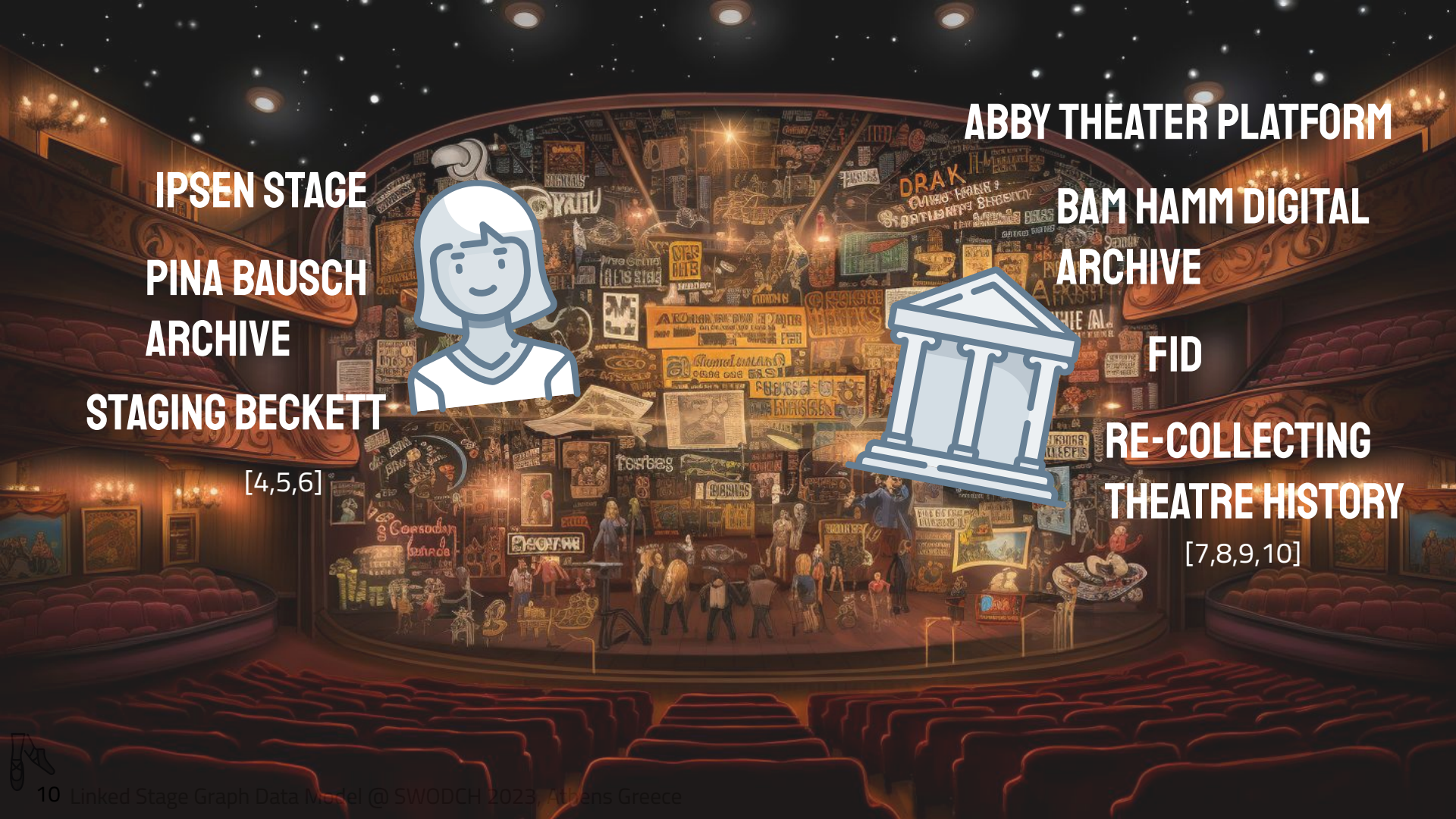
THEATRE HISTORY RESEARCH PROBLEM

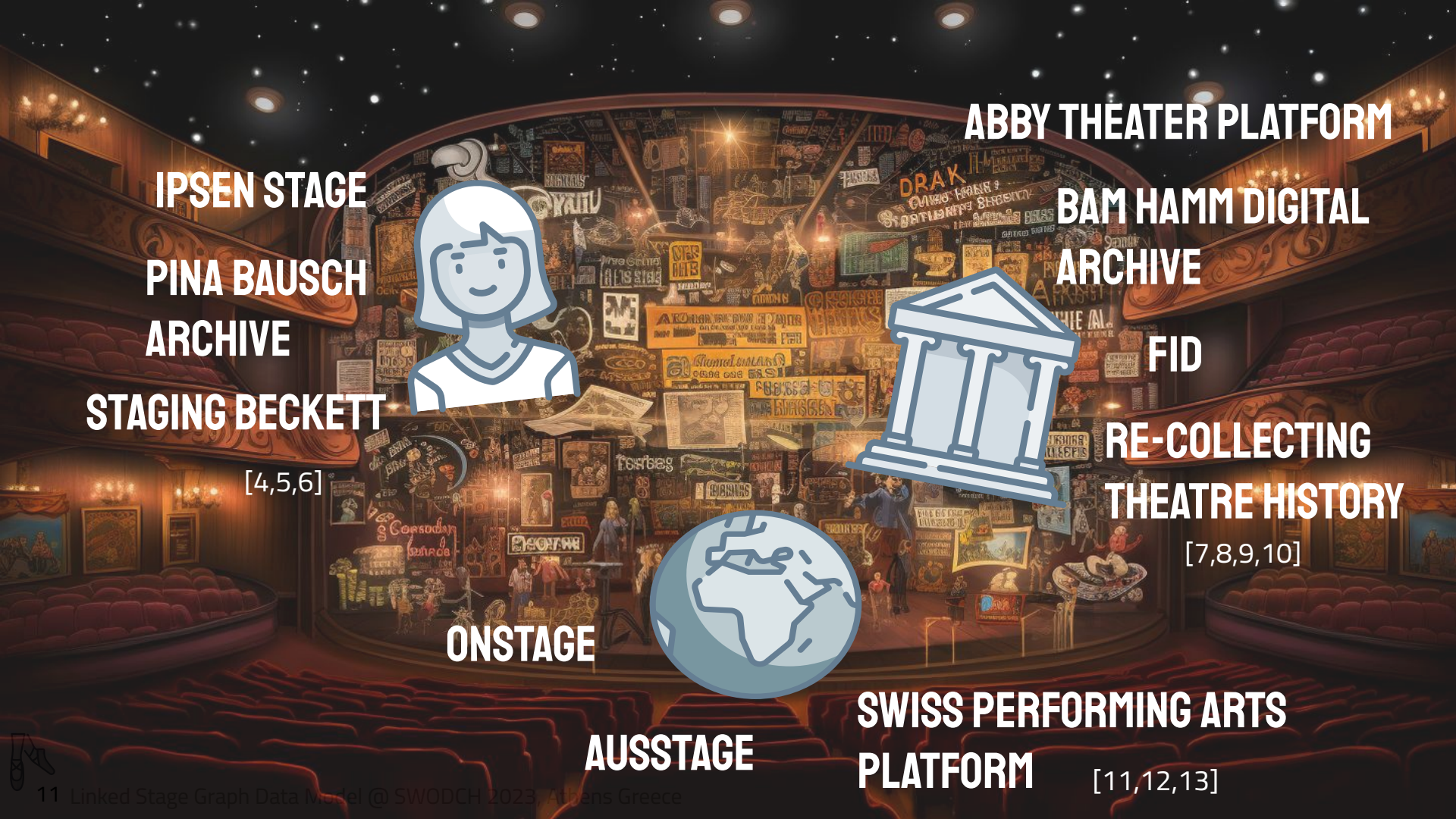
There is no commonly accepted ontology for historical performing arts data.

THEATRE HISTORY RESEARCH GOAL

- Requirements for data representation and exploration
- Lessons learned from the ongoing process of creating an application-driven and efficient data model on the use case of Linked Stage Graph
- Discussion of the Swiss Performing Arts (SPA) data model
- Presentation of modeling adaptations


IPSEN STAGE
PINA BAUSCH
ARCHIVE
STAGING BECKETT
[4,5,6]


ABBY THEATER PLATFORM
IPSEN STAGE
BAM HAMM DIGITAL ARCHIVE
PINA BAUSCH ARCHIVE
FID
STAGING BECKETT
[4,5,6]
RE-COLLECTING THEATRE HISTORY
[7,8,9,10]


IPSEN STAGE
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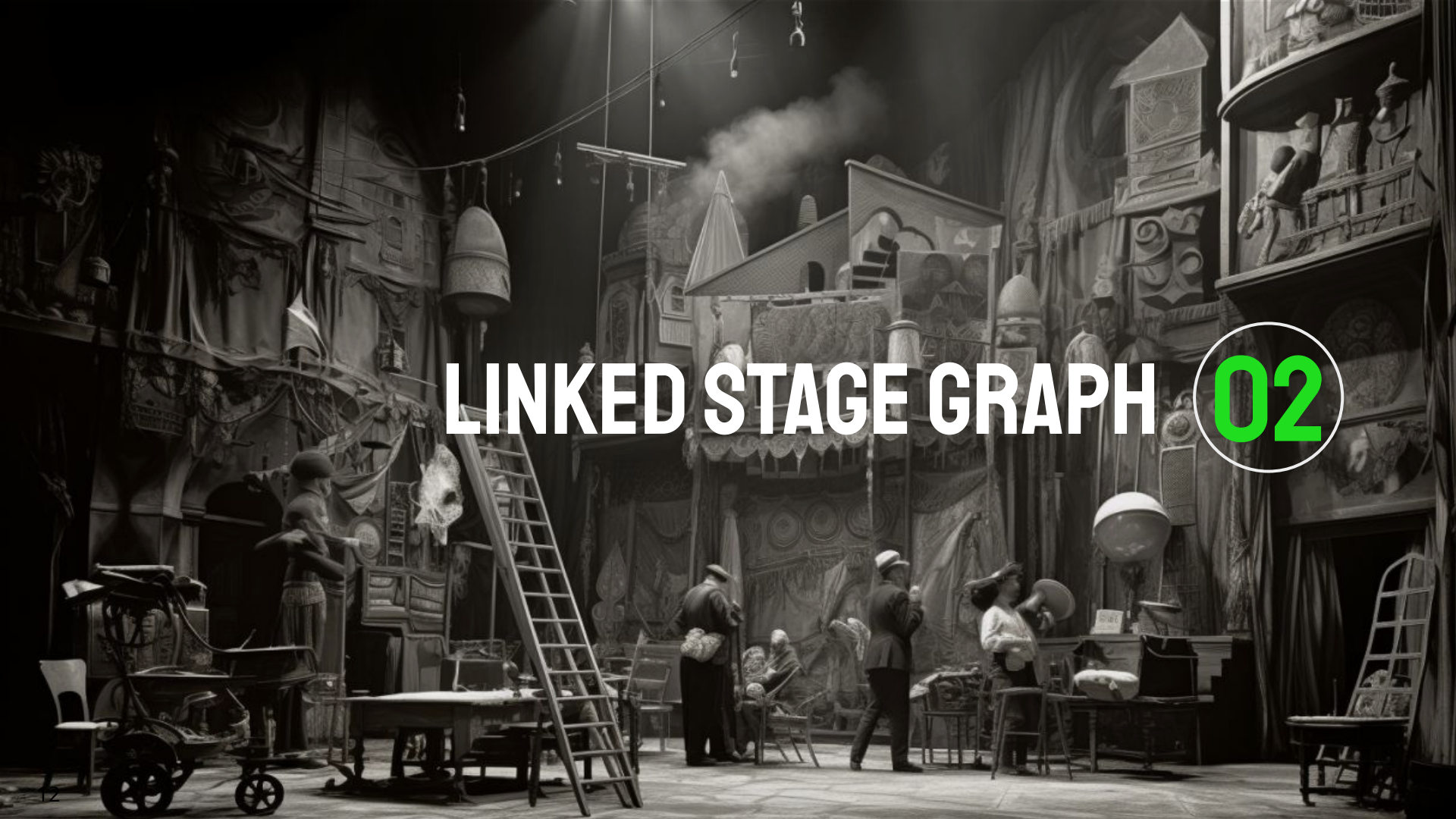
RE-COLLECTING THEATRE HISTORY
[7,8,9,10]
ONSTAGE
AUSSTAGE
SWISS PERFORMING ARTS PLATFORM
[11,12,13]


LINKED STAGE GRAPH
02

LINKED STAGE GRAPH

- Knowledge Graph containing archival data of the Stuttgart State Theatres
- Timeframe: 1890s - 1940s
- Images and metadata about performance events, on-stage and back-stage moments [14,15]
- Provided by the Baden-Wuerttemberg State Archives





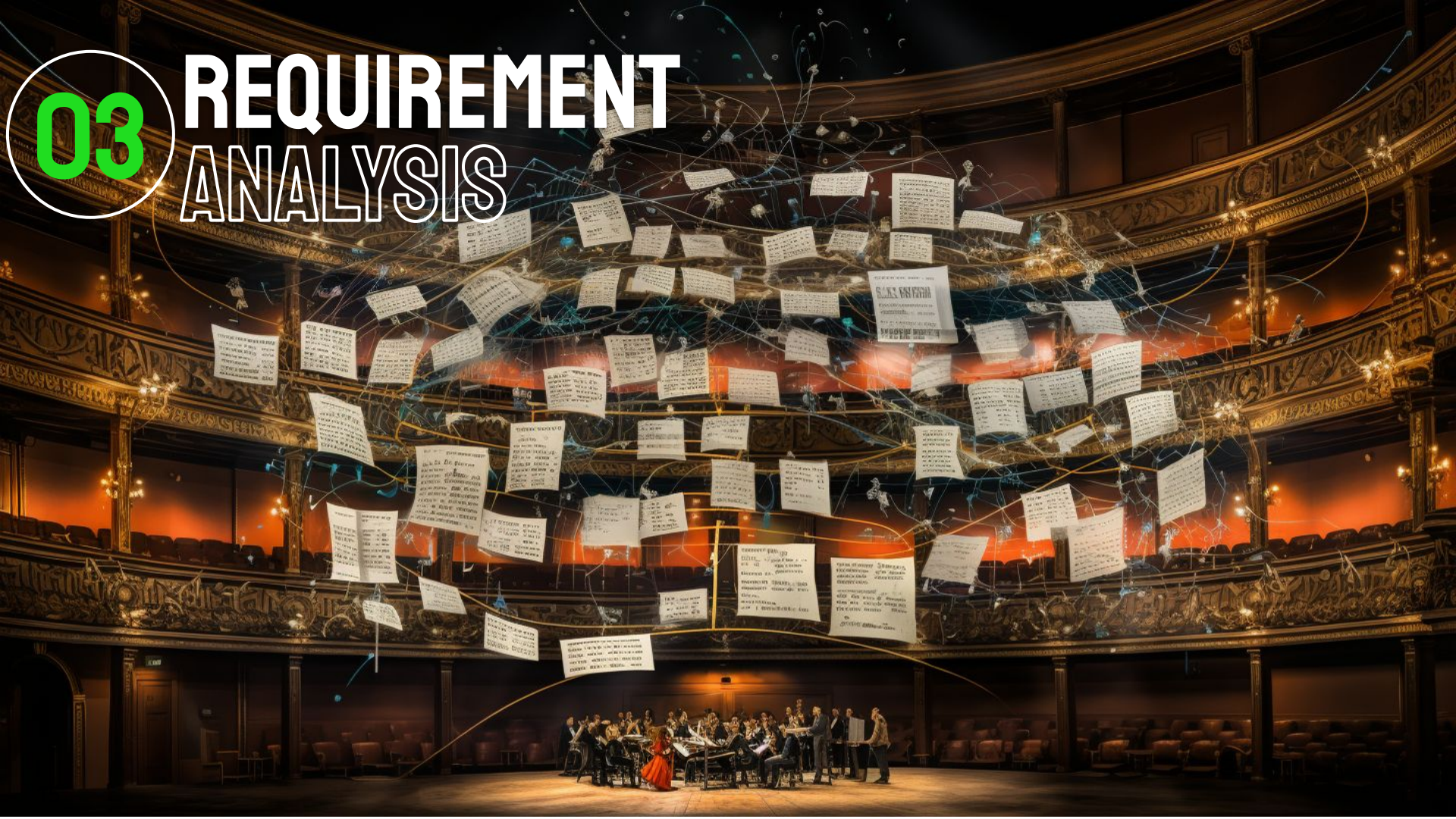
LINKED STAGE GRAPH

LIMITATIONS

- Simple conversion from EAD-XML to RDF
- Much noise in the data
- Lacks a meaningful, interoperable, and reusable ontology.

What do we need to create an open research resource, which enables an **efficient** and **scientifically accurate** exploration of historical performing arts data?

03 REQUIREMENT ANALYSIS



REQUIREMENTS

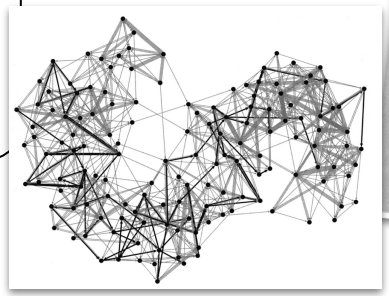
REQ1 CONTEXT

Provide as much context as possible. No entity in the performing arts exists on its own (e.g. archival object, performance, person, role, stage prop…)

REQ2 PERSPECTIVE

Provide different perspectives on performing arts data (holistic view).

- What were theatre networks?
- How did trends and patterns develop?
- How were plays distributed?



REQUIREMENTS

REQ3 INTEROPERABILITY

Enable the interconnection between disciplines (Gewerke), datasets, regional/ international efforts.

REQ4 PERSONS AND FUNCTIONS

All persons on, behind and in front of the stage of a performance and their functions are relevant.

- Who worked with whom?
- Which persons took on various functions throughout their career?
- Who worked in which institution?
- Who appeared on stage and in which order?

REQUIREMENTS

REQ5 CHANGE

Theater is dynamic and change over time should be revealed in terms of persons, occupations, stage design, etc.

REQ6 EVENTS

Performing arts data is (usually) event-based. Distinguish between a work and the performance as an event.

REQUIREMENTS

REQ7 STAGE ELEMENTS

Objects on stage are relevant for historiographical theatre research.

REQ8 QUERYING

A data model that represents performing arts data should be lightweight to enable intuitive querying for domain experts.

REQUIREMENTS

REQ9 PROVENANCE

It has to be possible to verify research results, e.g. biographical data has to be linked to their data source.

REQ10 DATA QUALITY

The quality of the data used in performing arts research has to be clear.

REQUIREMENTS

SOME TAKE-AWAYS

- We need an expressive, efficient and lightweight data model to represent performing arts data
- We have to preserve the original data structure provided by the archive
- We need a distinction between a performance event and an original literary source

→ We're committed to meeting all criteria, but we face hurdles in achieving some of them due to data sparsity.


04
DATA MODEL
Current Modeling
Challenges and Strategy

LINKED STAGE GRAPH DATA MODEL

MODULES

PERFORMING ARTS

Performance events, original works, places, persons and their functions..

ARCHIVAL STRUCTURE

Data structure as provided by the archive, based on (physical) files before digitization.

INFORMATION EXTRACTION

Analysis of the photographs depicting performances, backstage work,, theatre buildings [17]

LINKED STAGE GRAPH DATA MODEL

MODULES

PERFORMING ARTS

Performance events, original works, places, persons and their functions..

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Data structure as provided by the archive, based on (physical) files before digitization.

INFORMATION EXTRACTION

Analysis of the photographs depicting performances, backstage work,, theatre buildings [17]

LINKED STAGE GRAPH DATA MODEL
WORK - PERFORMANCE

CURRENTLY IN LINKED STAGE GRAPH:

All information about a single performance event, the original work and the archival objects are merged

(as provided by the archive)

Was ihr wollt (William Shakespeare)

http://slod.fiz-karlsruhe.de/labw-2-2599390

dcterms:**description**	Schauspiel Art und Datum der Aufführung: Neuinszenierung, 11.03.1923 Inszenierung: Curt Elwenspoek Bühnenbild: Felix Cziossek Kostüme: Ernst Pils



rdfs:**label**	Was ihr wollt (William Shakespeare)
schema:**genre**	Schauspiel
schema:**keywords**	Neuinszenierung
dcterms:**date**	11. März 1923

LINKED STAGE GRAPH DATA MODEL
WORK - PERFORMANCE

PROBLEM:

- A performance may significantly differ from its original work
- Is creative work on its own.

LINKED STAGE GRAPH DATA MODEL
WORK - PERFORMANCE

PROBLEM:

- A performance may significantly differ from its original work
- Is creative work on its own.
- Shakespeare authored "The Twelfth Night" (literary source)
- Didn’t provide creative input to the German play "Was ihr Wollt", performed on March 11, 1923.

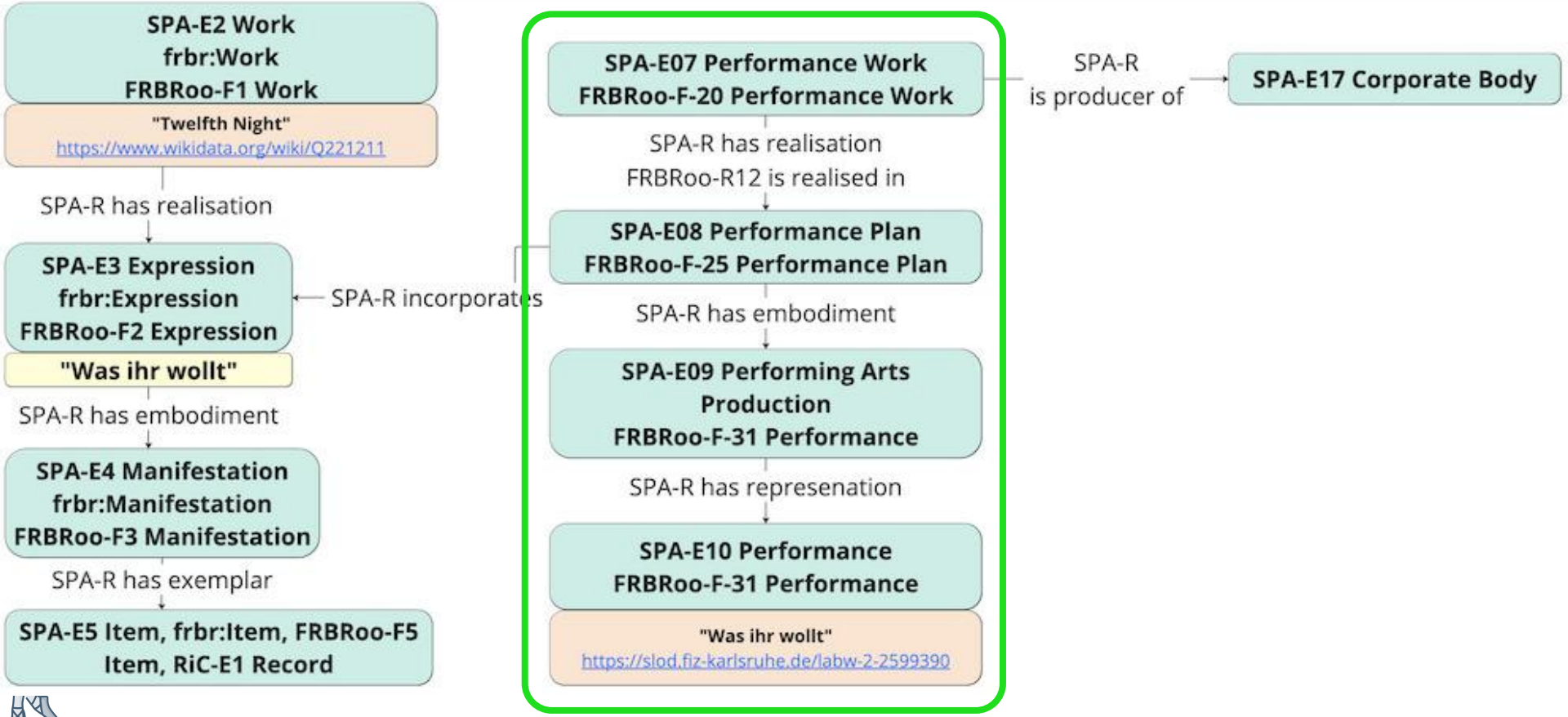
LINKED STAGE GRAPH DATA MODEL

SPA

- The **Swiss Performing Arts (SPA)** data model is the best documented data model that is available in the performing arts domain:
  - Event based and
  - Emphasizes the importance of differentiating the original work and the performance event itself
  - Aligned with CIDOC-CRM, FRBR and FRBRoo
- The SPA model is not intended for historical performing arts data specifically which often contains sparse metadata, is heterogeneous and depends on varying digitization and storing techniques.

LINKED STAGE GRAPH DATA MODEL

LINKED STAGE GRAPH DATA MODEL



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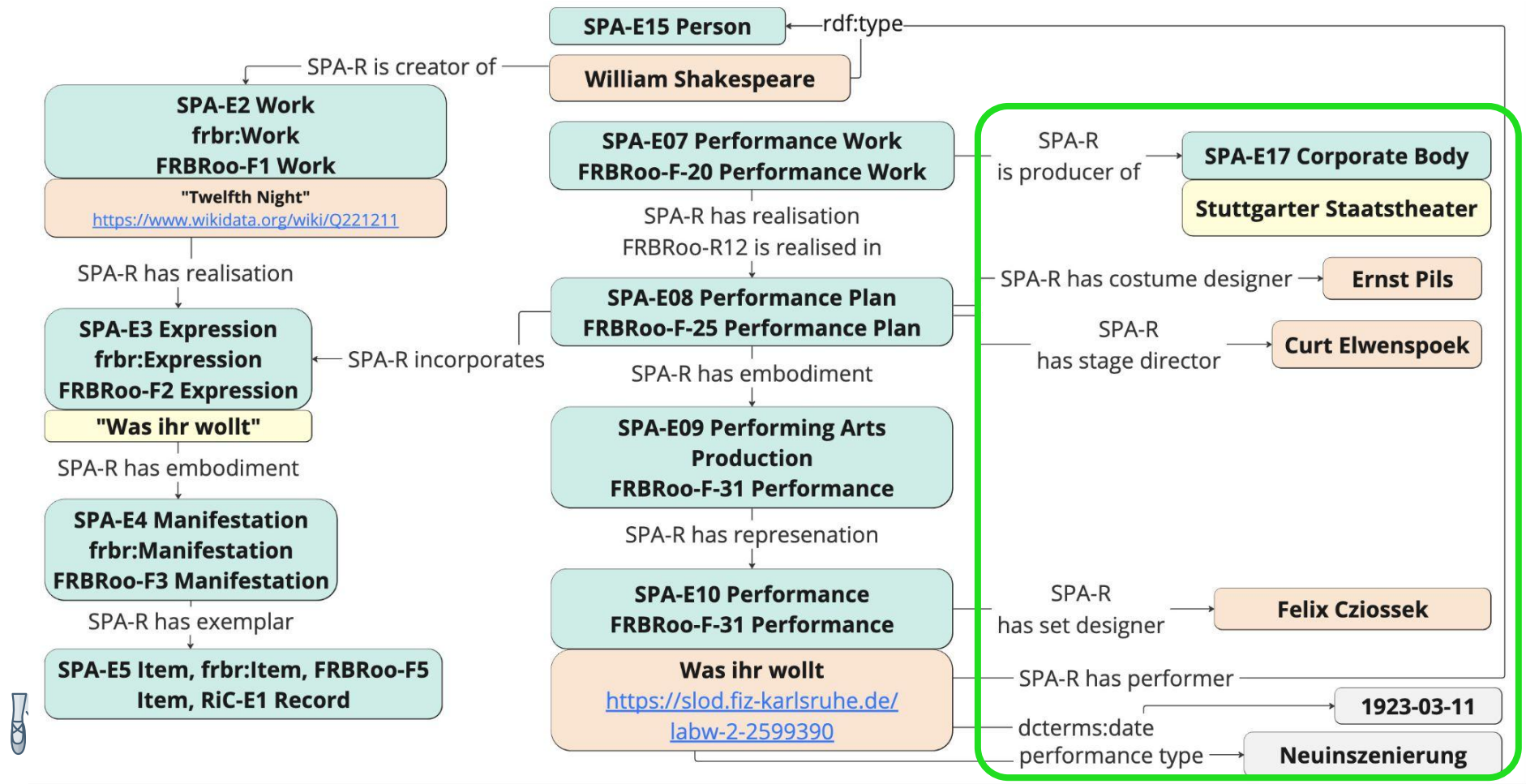

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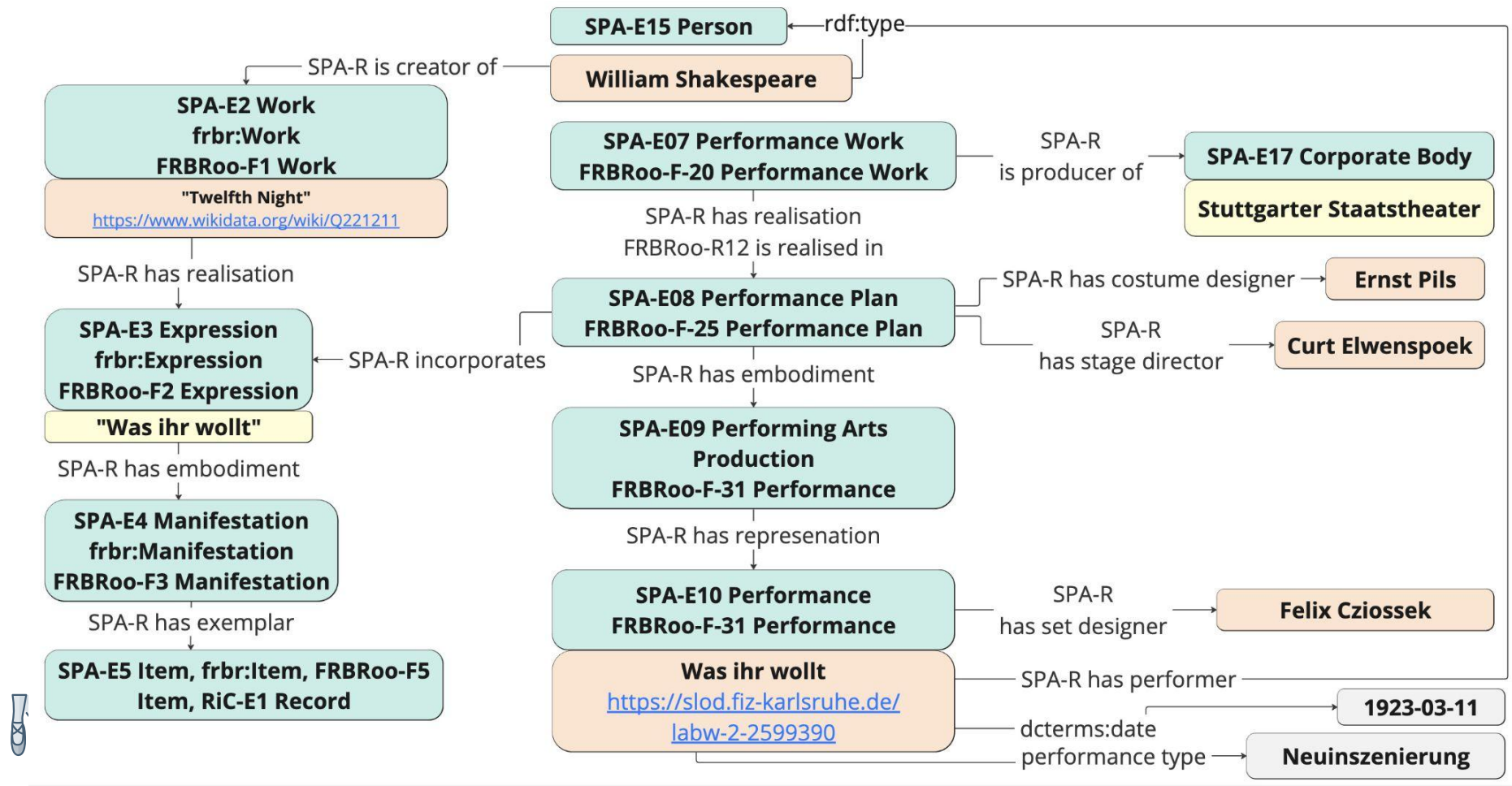


LINKED STAGE GRAPH DATA MODEL
SPA

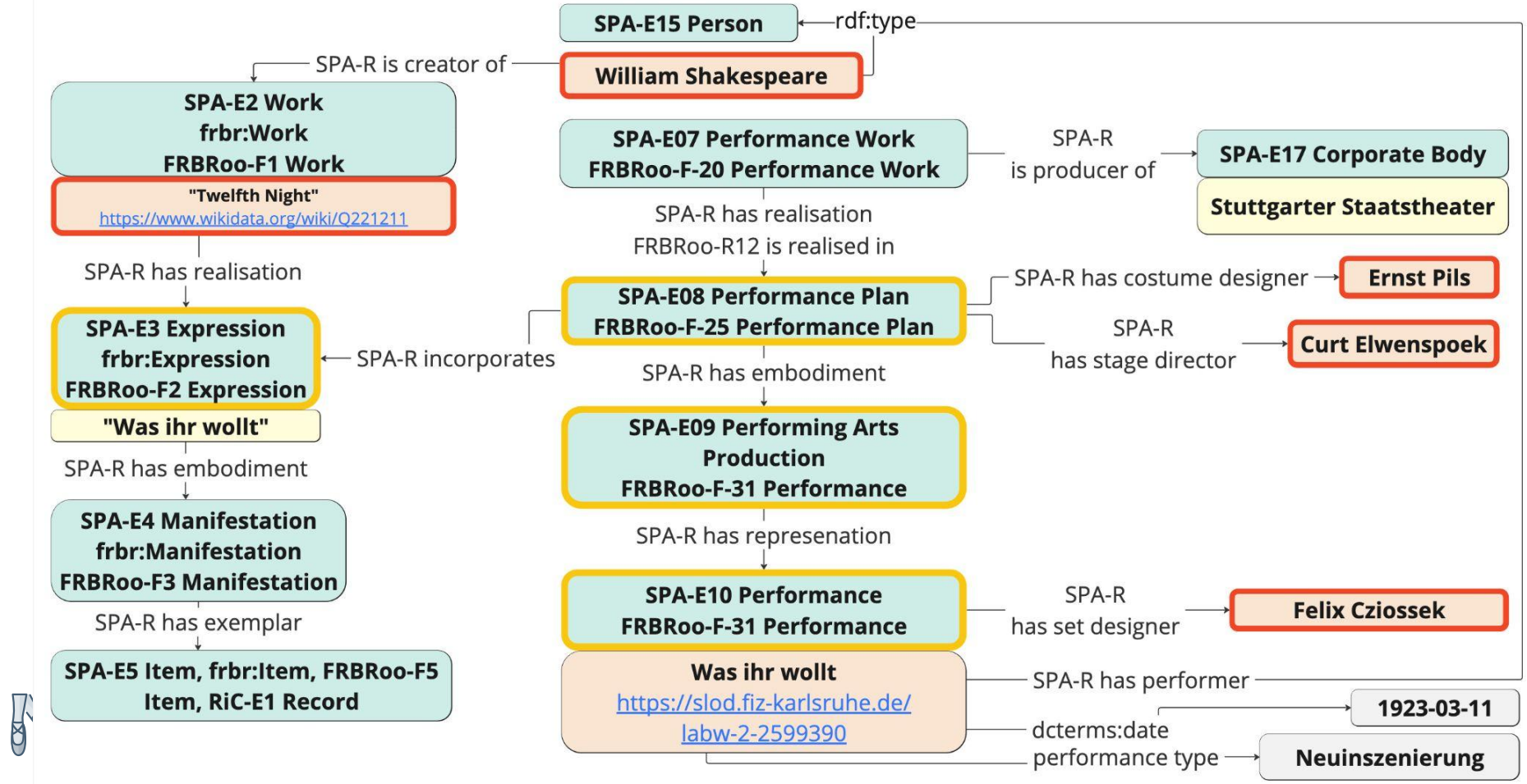
- Detailed differentiation between performance work, plan, production
  → real-world representation of the entities
  → highly complex
- Assumes rich metadata about performances

LINKED STAGE GRAPH DATA MODEL

COMPETENCY QUESTION:

Find all persons involved in a performance event which is based on a literary work by William Shakespeare.

LINKED STAGE GRAPH DATA MODEL



LINKED STAGE GRAPH DATA MODEL

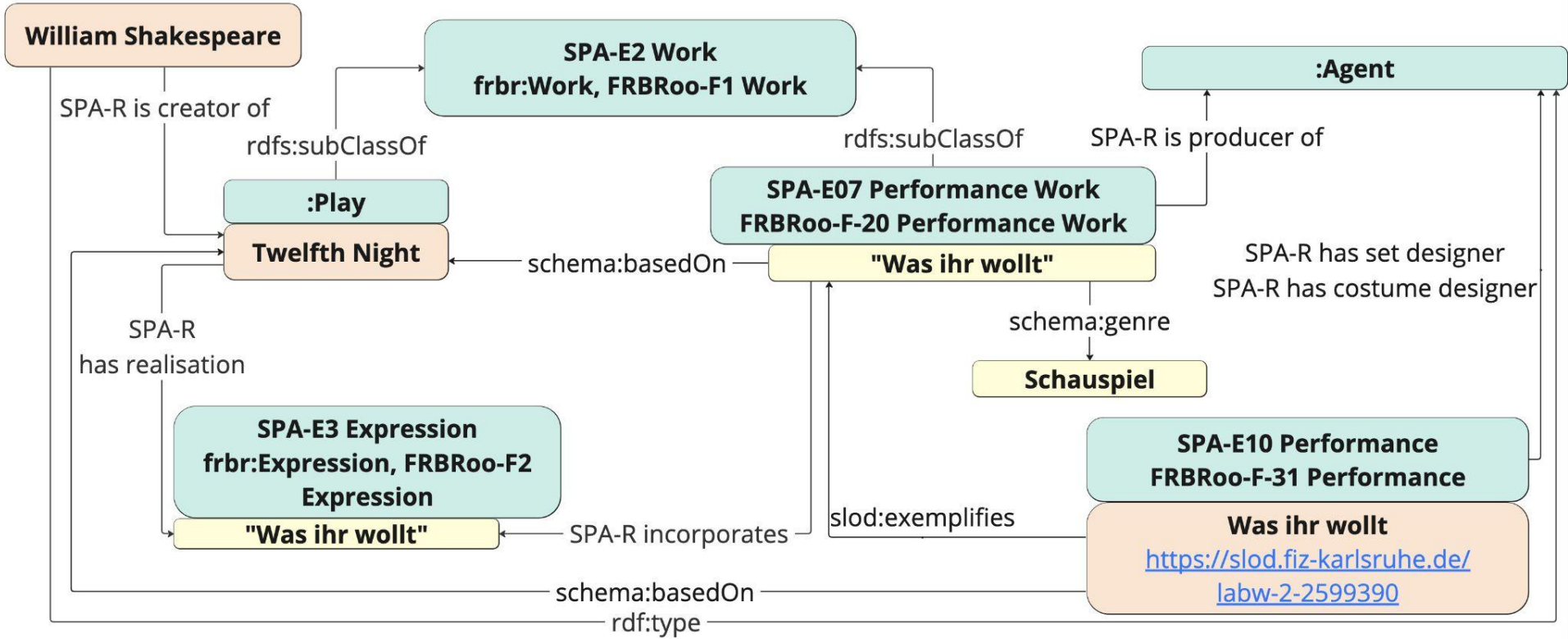
SPA ADAPTATION

MODELING SUGGESTION

- Utilizes essential parts of the SPA model
- Lightweight simplified version to improve query efficiency and exploration capability
- Extends SPA data model by providing a set of direct relations between entities of different granularities

  → Allows for omitting Performance Plan and Performing Arts Production

LINKED STAGE GRAPH DATA MODEL

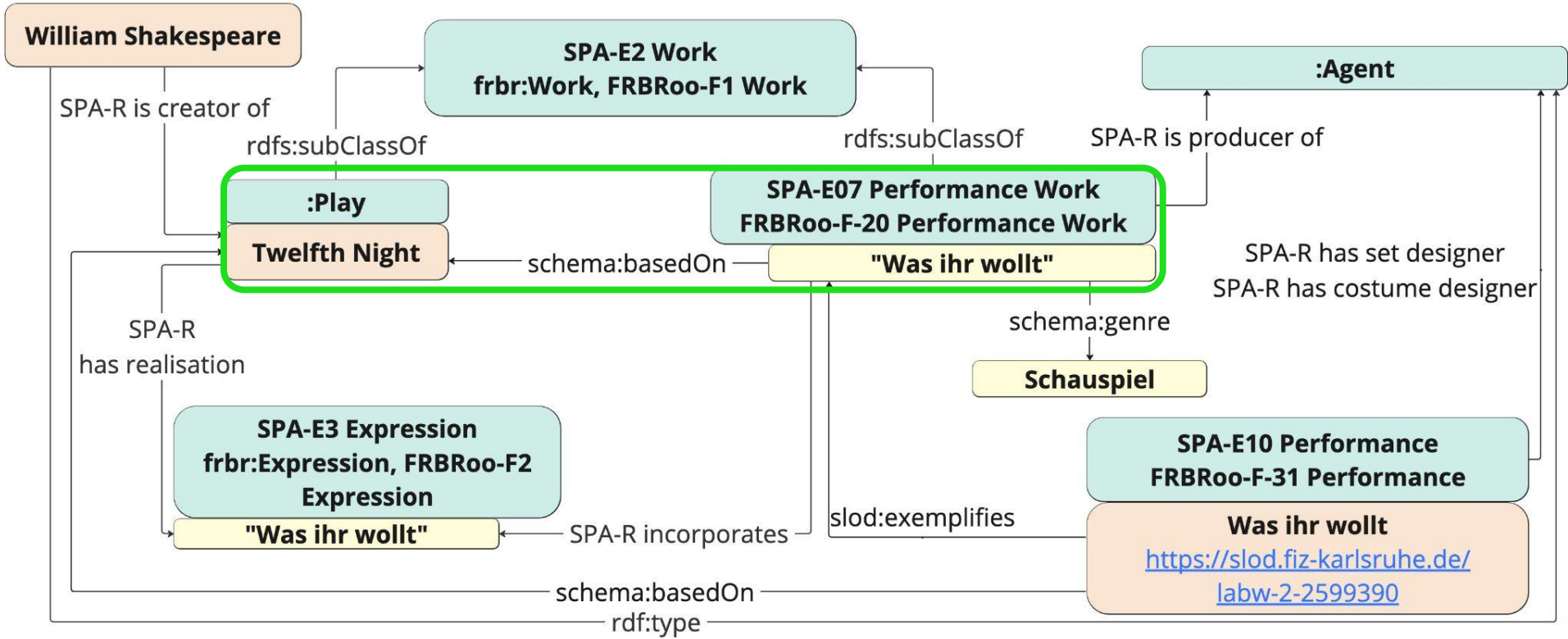


LINKED STAGE GRAPH DATA MODEL

COMPETENCY QUESTION:

Which literary source is a performance work based on?

LINKED STAGE GRAPH DATA MODEL



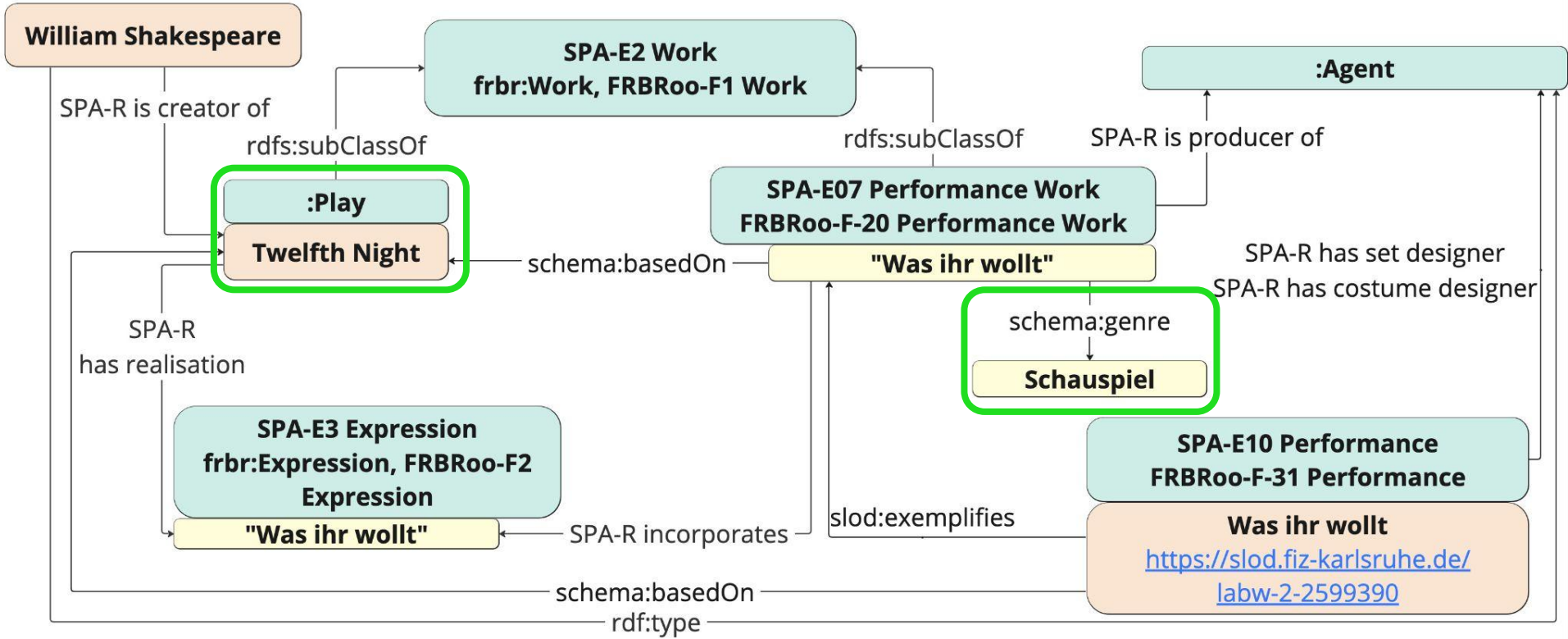
LINKED STAGE GRAPH DATA MODEL

COMPETENCY QUESTIONS:

- List all performances in the genre “Schauspiel”
- List all performances which are based on a literary source in the genre of “Play”

→ Work and Performance can have different genres

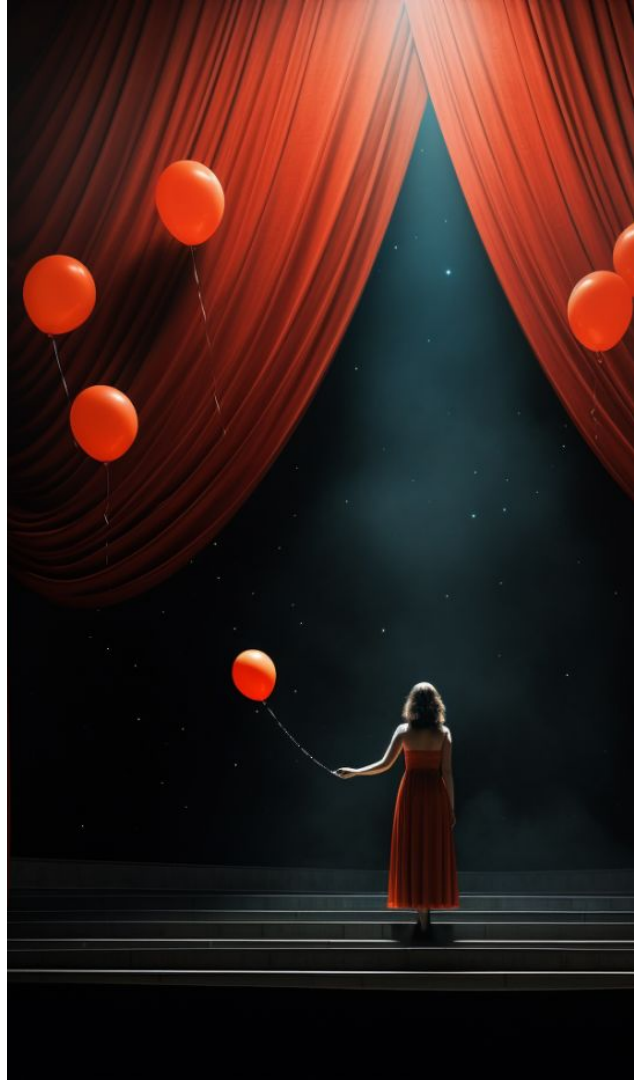
LINKED STAGE GRAPH DATA MODEL



LINKED STAGE GRAPH DATA MODEL

CONCLUSION

- SPA is extensive and detailed and complex
- Assumes a richness in metadata about persons and their functions which often historical cultural heritage collections cannot deliver.
- Reuse within the performing arts community is rather low.



LINKED STAGE GRAPH DATA MODEL

CONCLUSION

WORK IN PROGRESS:

- Simplified version of the SPA model
- Lightweight, interoperable, easy to further extend and specify.

LINKED STAGE GRAPH DATA MODEL

CONCLUSION

WORK IN PROGRESS:

- Goal is to create an expressive and efficient data model for
  - Linked Stage Graph
  - the performing arts community
- Leveraging existing standards and ontologies like CIDOC-CRM, FRBR, and FRBRoo.

THANK YOU!

TABEA TIETZ
OLEKSANDRA BRUNS
HARALD SACK

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RESOURCES

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