university of groningen

# The GOLEM Knowledge Graph

## Modelling Fiction and Narrative Across Domains

Graphs and Ontologies for Literary Evolution Models

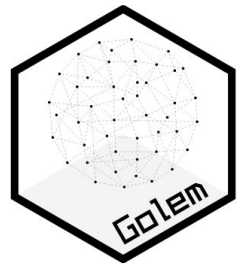
A 5-year (2023-2027) research project funded by the European Commission (ERC StG)

European Research Council
Established by the European Commission

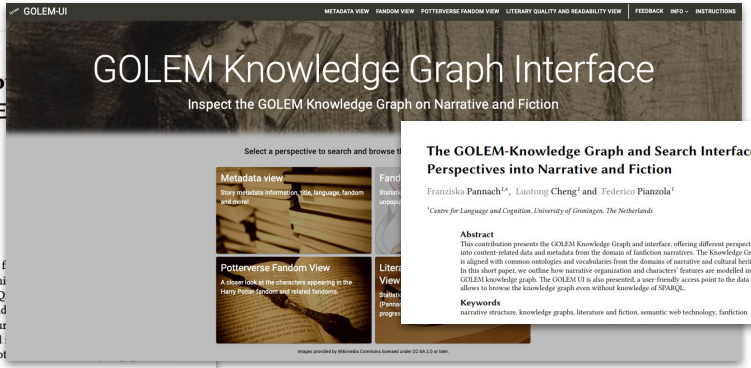
**Franziska Pannach, Federico Pianzola**

# Outline

1. **Why we need it**: motivations for a formal ontology and KG
2. **What we did**: workflow & bottlenecks
3. **What we have right now**: golem:predicates and state of the KG
4. **What we can do**: mini demo
5. **Where we want to go**: ongoing work



# GOLEM so far …




**Across the Pages: A Comparative Study o**
**Response to Web Novels in Chinese and E**
**and WebNovel**

Ze Yu[1,*], Federico Pianzola[1]

[1]Center for Language and Cognition, University of Groningen, The Netherlands

**Abstract**
The evolution of online reading platforms has transformed engagement with f
bridging cultural boundaries through translated Chinese web novels. Thi
compare reader responses to the same stories published in Chinese on Q
focusing on English and Chinese language comments. We identify shared and
both communities emphasize characterization and story development, cultur
dynamics shape readers' interactions. Our findings underscore the nuanced
and the affordances of digital platforms in shaping global literary consumpt

**Keywords**
Digital social reading, reader response, cross-cultural studies, topic modeling

**The GOLEM Triple Store: A Graph-**
**Representation of Narrative and Fic**

Franziska Pannach[1,*], Xiaoyan Yang[1], Noa Visser Solissa
Andreas van Cranenburgh[1], Michiel van der Ree[2] and F

[1]Center for Language and Cognition (CLCG), University of Groningen
[2]Center for Information Technology (CIT), University of Groningen

**Abstract**
In this paper, we present the GOLEM triple store, a massive triple store resource for fictio
This triple store is the first step towards a large-scale knowledge-graph for stories, as we
and events in narratives. At the moment, it contains more than 8 million stories colle
Archive of Our Own (AO3) [1], providing scholars with a tool to derive unique insights int
and storytelling trends over time.

**Table 1**
Triple Store Predicates

| Predicate | |
|---|---|
| golem:author | |
| golem:characters | |
| golem:collections | |
| golem:contentWarning | |
| golem:datePackaged | |
| golem:datePublished | |
| golem:dateModified | |
| golem:fandom | Good Omens (TV Show) |
| golem:keyword | Loch-Ness Monster |
| golem:language | English, Italiano |
| golem:numberOfChapters | |
| golem:numberOfComments | |
| golem:numberOfKudos | |
| golem:numberOfWords | |
| golem:publicationStatus | |
| golem:publisher | |
| golem:rating | |
| golem:romanticCategory | |
| golem:socialRelationships | |
| golem:series | |
| golem:summary | |
| golem:title | |

Fictional universe(s) of the story
User-provided content keywords
Language in which the story is written
Number of chapters
Number of comments
Number of user-approvals (similar to likes)
Number of words

**Exploring the Evolution of Gender Power Difference through the Omegaverse Trope on AO3 Fanfiction***

Xiaoyan Yang[1,*], Federico Pianzola[1]

[1]Centre for Language and Cognition, University of Groningen, The Netherlands

**Abstract**
This study examines the evolution of gender power differences within the Omegaverse trope on the Archive of Our Own (AO3) fanfiction platform. The Omegaverse, a fan created trope defined by distinct secondary gender categories (Alpha, Beta, Omega), provides a lens to explore and critique gender dynamics. We used connotation frames and the Riveter NLP pipeline to measure power dynamics in Omegaverse slash relationships between characters. Our corpus includes English stories across eight prominent fandoms, including Japanese anime, K-pop, Western TV series, and Western films. Our findings show Alphas generally exhibit higher power scores than Omegas, consistent with the trope's constructs, but with notable variance between fandoms, while most fandoms exhibit more within-group consensus when more fans start writing. This research offers insights into how fan communities evolve and challenge traditional power structures.

**Keywords**
Gender studies, cultural analytics, fanfiction, media studies

**Fandom and the Ancient World Conference**

**Programme October 4th - In Person in Nijmegen**

**Erasmus building room E. 9.14**

10:00 Welcome and introductory paper – Julia Neugarten

10:30 **Panel 1 Fanfiction, history and mythology**

Franziska Pannach - *Rape, Murder, and Death in Fanfiction Adaptations of Mythological Narratives in the Classical Domain: A Frame-Semantic Analysis*

**GOLEM Ontology: Graphs and Ontologies for Literary Evolution Models**

made by pyLODE 3.1.4 with the OntPub profile

**IRI:**
https://ontology.golemlab.eu/
**Version:**
1.0
**Date:**
October 10, 2024
**Contributors:**
GOLEM Lab
**License:**
CC BY 4.0

**Description:**

Ontology of fiction and narrative, developed as an extension of CIDOC-CRM and LRMoo, and aligned to DOLCE-Lite-Plus.

Narrative phenomena can be viewed as interconnected systems in which various components influence one another. Un
and within their broader context, rather than in isolation (Pianzola, 2018). Formal ontologies provide a structured and sy
relevant concepts, constraints, and interrelationships among narrative elements, ontology ensures a consistent and expl

In literary studies, traditional quantitative and probabilistic methods often struggle to account for the semantic richness
the complexities of narrative structure, making these elements explicit and computable.

The GOLEM project developed an ontology that models narratives and fiction independently of their specific domains. To
elements of narrative structure—such as events, characters, social relationships, and settings—interrelate. By employing
encapsulate these narrative components, including modules for characters, relationships, events, settings, and narrative

The detailed description of each module can be read in the GitHub.

Furthermore, the ontology contributes to comparative studies by providing a structured framework for analyzing narrativ
evolution in narratives, allowing for a more nuanced exploration of how narratives evolve and grows cumulatively over t

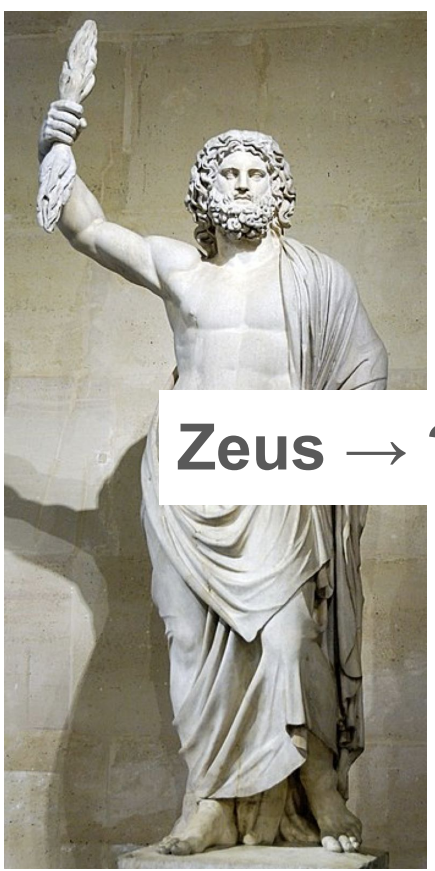
References:

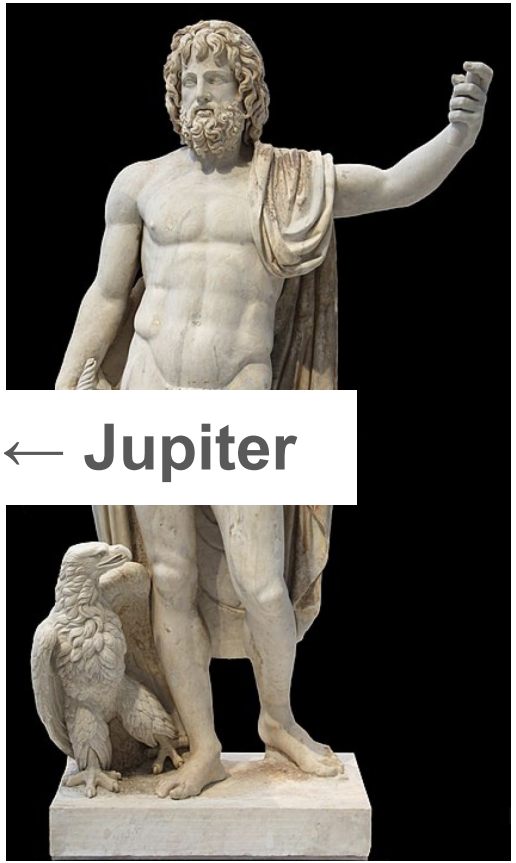
Abbott, H. P. (2019). Narrativity. In P. Hühn et al. (Eds.), *The living handbook of narratology*. Hamburg University.

Bartalesi, V., Meghini, C., & Metilli, D. (2017). A conceptualisation of narratives and its expression in the CRM. *Internatior*
IJMSO.2017.10005083

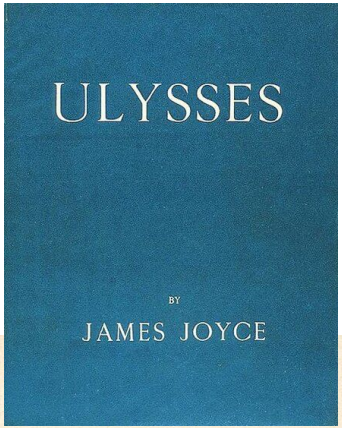
Bekiari, C., Bruseker, G., Canning, E., Doerr, M., Michon, P., Ore, C.-E., Stead, S., & Velios, A. (2024, October). Conceptual

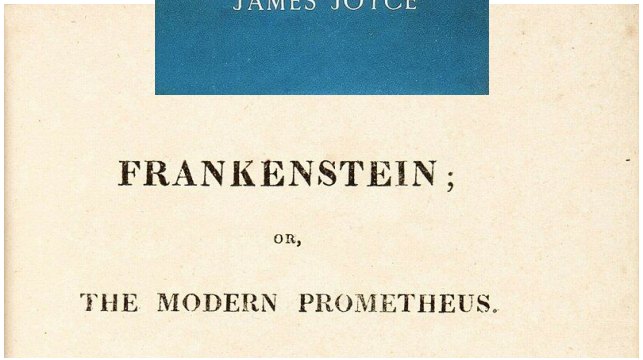
# Variants of Fictional Characters and Stories



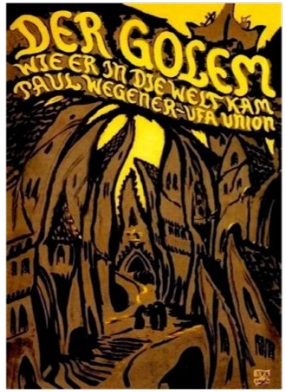


**Zeus → ? ← Jupiter**

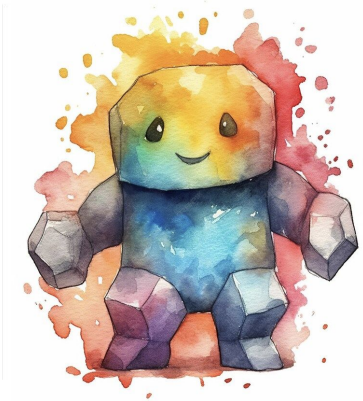


# Variants of Fictional Characters and Stories







# What: Workflow

- Data: Archive of Our Own (Dec 2022)
- Data-ElasticSearch “Database”-Triplestore-KG
- Triples model the metadata structure
- Formal ontology models metadata and extracted features
- Authors anonymized
- Triplestore and KG on Virtuoso Server
- Theory-driven approach (literary theory, narratology)
- Align with standards for cultural heritage, e.g. CIDOC-CRM, LRMoo

# Case Study: Archive of Our Own Data

| | |
|---|---|
| Rating: | General Audiences |
| **Archive Warning:** | **No Archive Warnings Apply** |
| Category: | F/M |
| Fandom: | Marvel Cinematic Universe |
| Relationship: | Peggy Carter/Steve Rogers |
| Characters: | Steve Rogers, Peggy Carter |
| Additional Tags: | Alternate Universe - Modern Setting, Ice Skating, Fluff, Steggy Secret Santa |
| Language: | English |
| Stats: | Published: 2020-01-01 Words: 1,224 Chapters: 1/1 Comments: 14 Kudos: 86 Bookmarks: 7 Hits: 729 |

## Peggy on Ice

chasingkerouac

Summary:

Peggy Carter is good at so many things. Ice skating is not one of them.

Notes:

For NEStar.

Part of the Steggy Secret Santa 2019. It's not exactly what you asked for, but I hope that you enjoy a moment of fluff and light-hearted winter fun.

# Triplestore Predicates

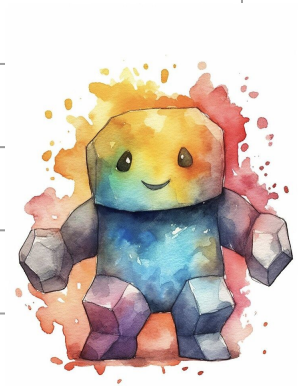
**Table 1**
Triple Store Predicates

| Predicate | Explanation | Example |
|---|---|---|
| golem:author | Username Author (anonymised) | |
| golem:characters | Characters appearing in the story | Molly Weasley |
| golem:collections | Title of the collection that a story is part of | Good Omens Minisode Minibang 2024 |
| golem:contentWarning | Content warnings regarding level of violence/sexuality | Graphic Depictions Of Violence |
| golem:datePackaged | Date packaged for the project database | |
| golem:datePublished | Date published on AO3 | |
| golem:dateModified | Date updated by the author | |
| golem:fandom | Fictional universe(s) of the story | Good Omens (TV Show) |
| golem:keyword | User-provided content keywords | Loch-Ness Monster |
| golem:language | Language in which the story is written | English, Italiano |
| golem:numberOfChapters | Number of chapters | |
| golem:numberOfComments | Number of comments | |
| golem:numberOfKudos | Number of user-approvals (similar to likes) | |
| golem:numberOfWords | Number of words | |
| golem:publicationStatus | In-Progress or Completed | |
| golem:publisher | Source platform | archiveofourown.org |
| golem:rating | Content-rating, level of sexuality/violence | Teen and Up Audiences |
| golem:romanticCategory | Classification for romantic relationships within the story | F/M, Gen (no rel.) |
| golem:socialRelationships | Social, e.g. romantic or sexual relationships between characters | Arthur/Molly Weasley |
| golem:series | Series the work is a part of, if any | |
| golem:summary | Text of the summary | |
| golem:title | Title | |

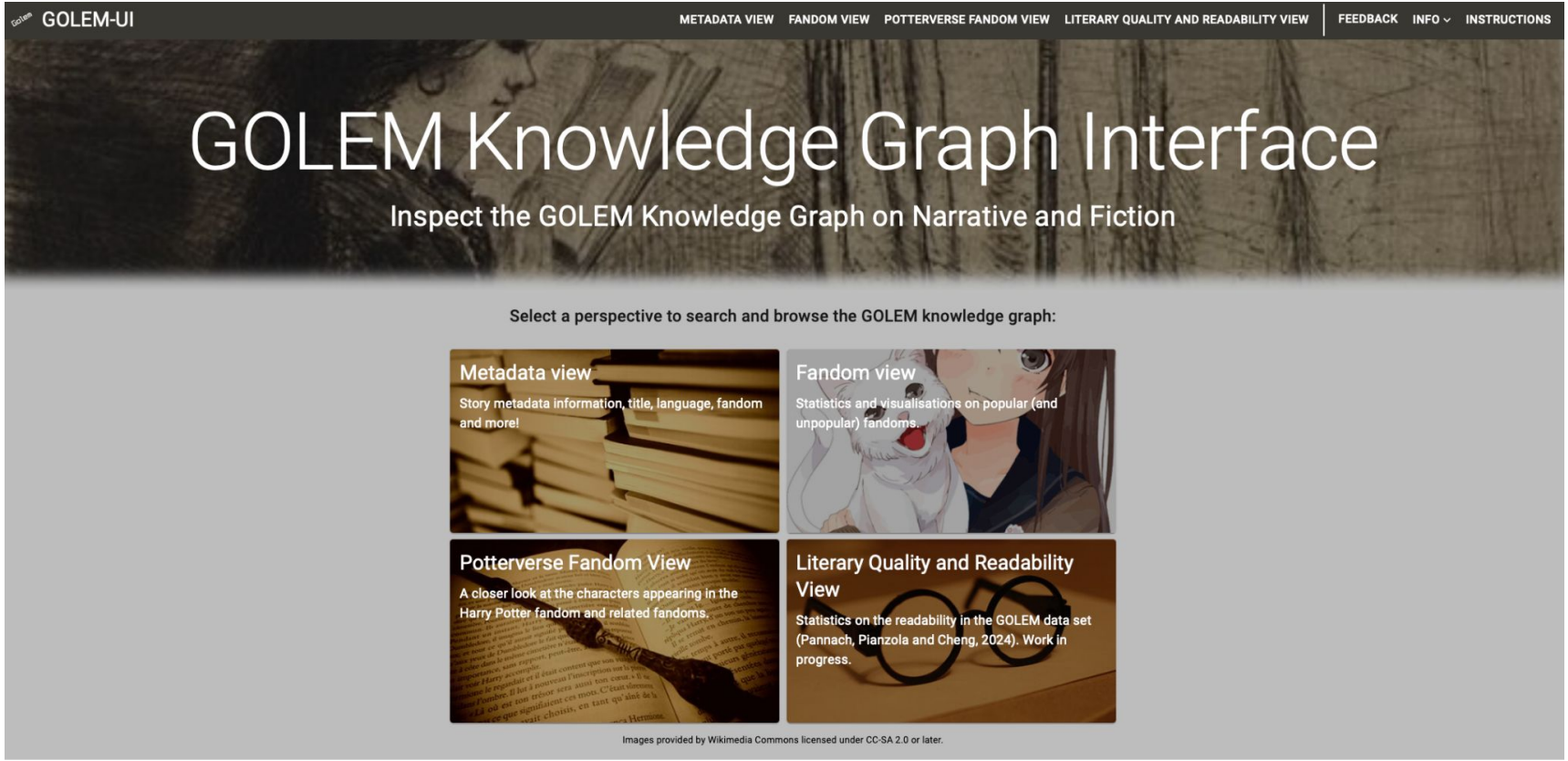
# Current State of the Triplestore

Triple store publicly available at: http://graph.golemlab.eu:8890/sparql/

| | **#Items** |
|---|---|
| Triples | 395,450,235 (2.6% of Wikidata:15,019,727,427) |
| Stories | 8,280,495 |
| Authors | 1,227,827 |
| Fandoms | 142,495 |
| (Stories by) Orphaned Accounts | 258,736 (21 % of Authors) |
| (Stories by) Anonymous Accounts | 59,007 (4.7 % of Authors) |
| Avg. Stories/Author | 6.7 |



# Infrastructure Building: Knowledge Graph UI



# Infrastructure Building: Knowledge Graph UI


**The GOLEM-Knowledge Graph and Search Interface: Perspectives into Narrative and Fiction**

Franziska Pannach[1,*], Luotong Cheng[1] and Federico Pianzola[1]

[1]*Centre for Language and Cognition, University of Groningen, The Netherlands*

**Abstract**

This contribution presents the GOLEM Knowledge Graph and interface, offering different perspectives into content-related data and metadata from the domain of fanfiction narratives. The Knowledge Graph is aligned with common ontologies and vocabularies from the domains of narrative and cultural heritage. In this short paper, we outline how narrative organization and characters' features are modelled in the GOLEM knowledge graph. The GOLEM UI is also presented, a user-friendly access point to the data that allows to browse the knowledge graph even without knowledge of SPARQL.

**Keywords**

narrative structure, knowledge graphs, literature and fiction, semantic web technology, fanfiction

**https://search.golemlab.eu/en/**

# Basis of a Formal Ontology for Fiction and Narrative


DOLCE
(Descriptive Ontology for Linguistic and Cognitive Engineering)

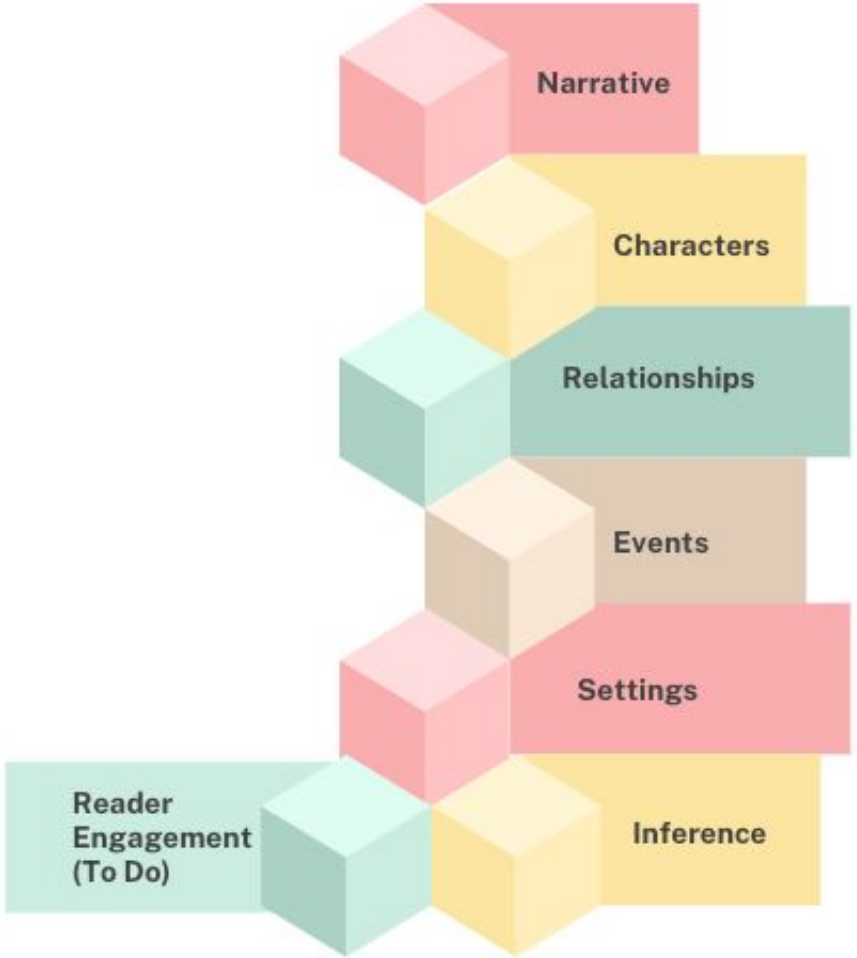
CIDOC CRM
CONCEPTUAL REFERENCE MODEL

LRMoo
Library Reference Model

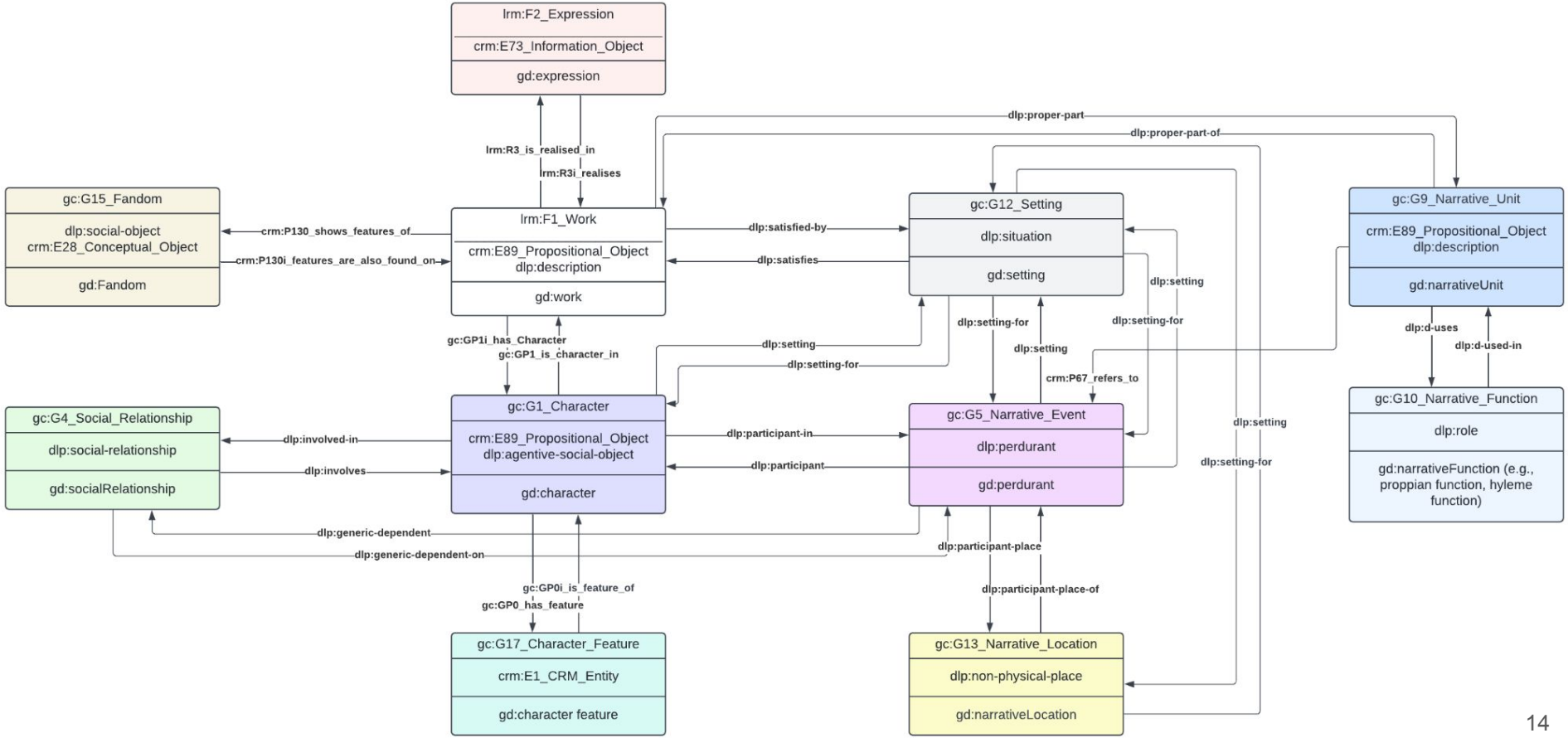
# Ontology Modules

Description:

https://ontology.golemlab.eu/
https://github.com/GOLEM-lab/golem-ontology/wiki



# Formal Ontology (Data Modeling)



# Formal Ontology for Fiction and Narrative

**Character** module should (minimally) express:

1. Characters are entities that appear in multiple **contexts** (e.g. a novel, its film adaptation, a wiki entry)
2. Characters have some recognizable **features** (e.g. appearance)
3. Characters engage in social **relationships** (e.g. become friends)
4. Characters do things and participate in **events** (e.g. fight a dragon)
5. Characters fulfill some roles in the **plot** development (e.g. villain)
6. All the above aspects are either **explicitly** stated in the fiction (e.g. “Harry is brave”) or **inferred** from it (e.g. “Harry jumps into the fire to rescue Ron”)
7. The **provenance** of each statement about characters should be clear.

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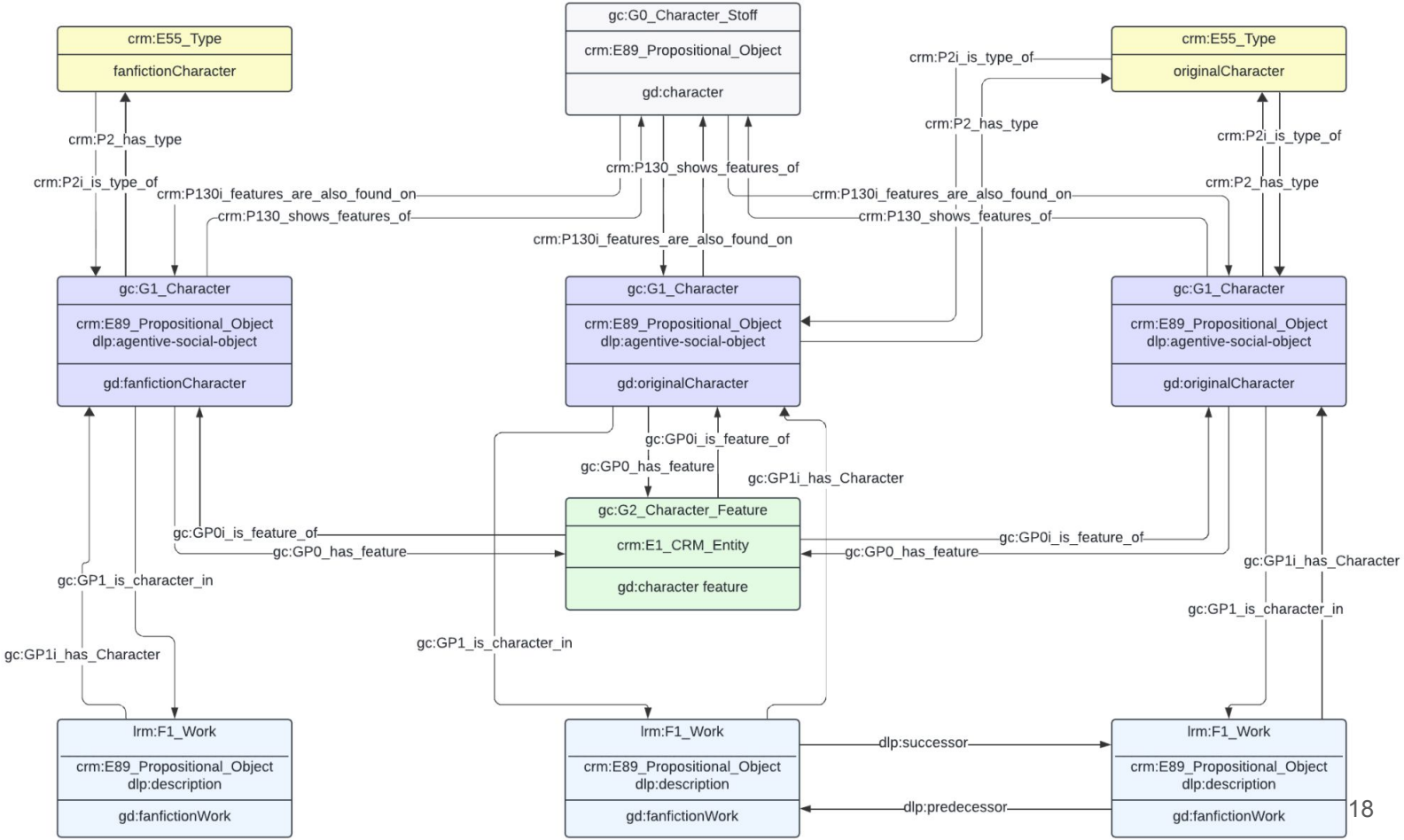
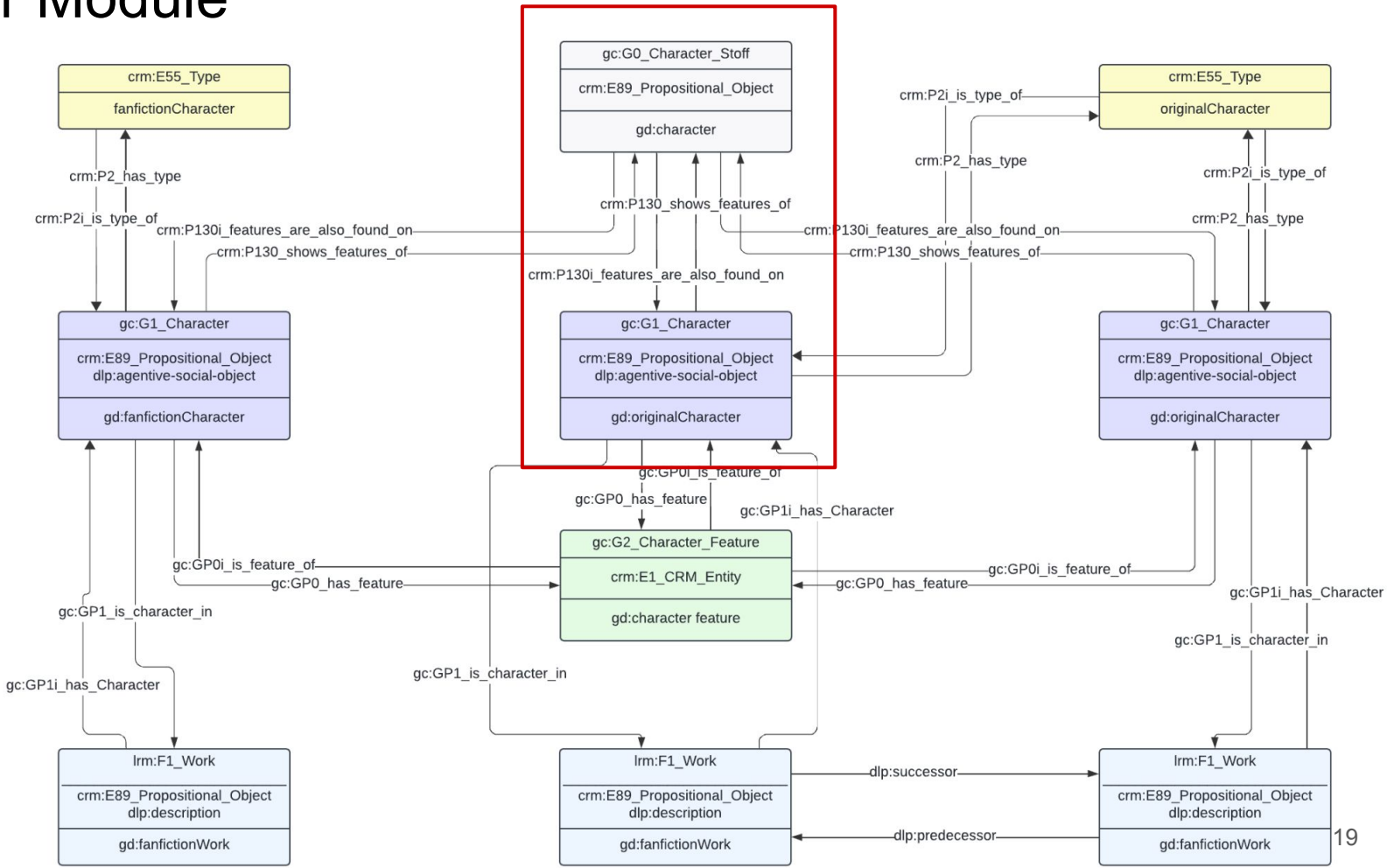
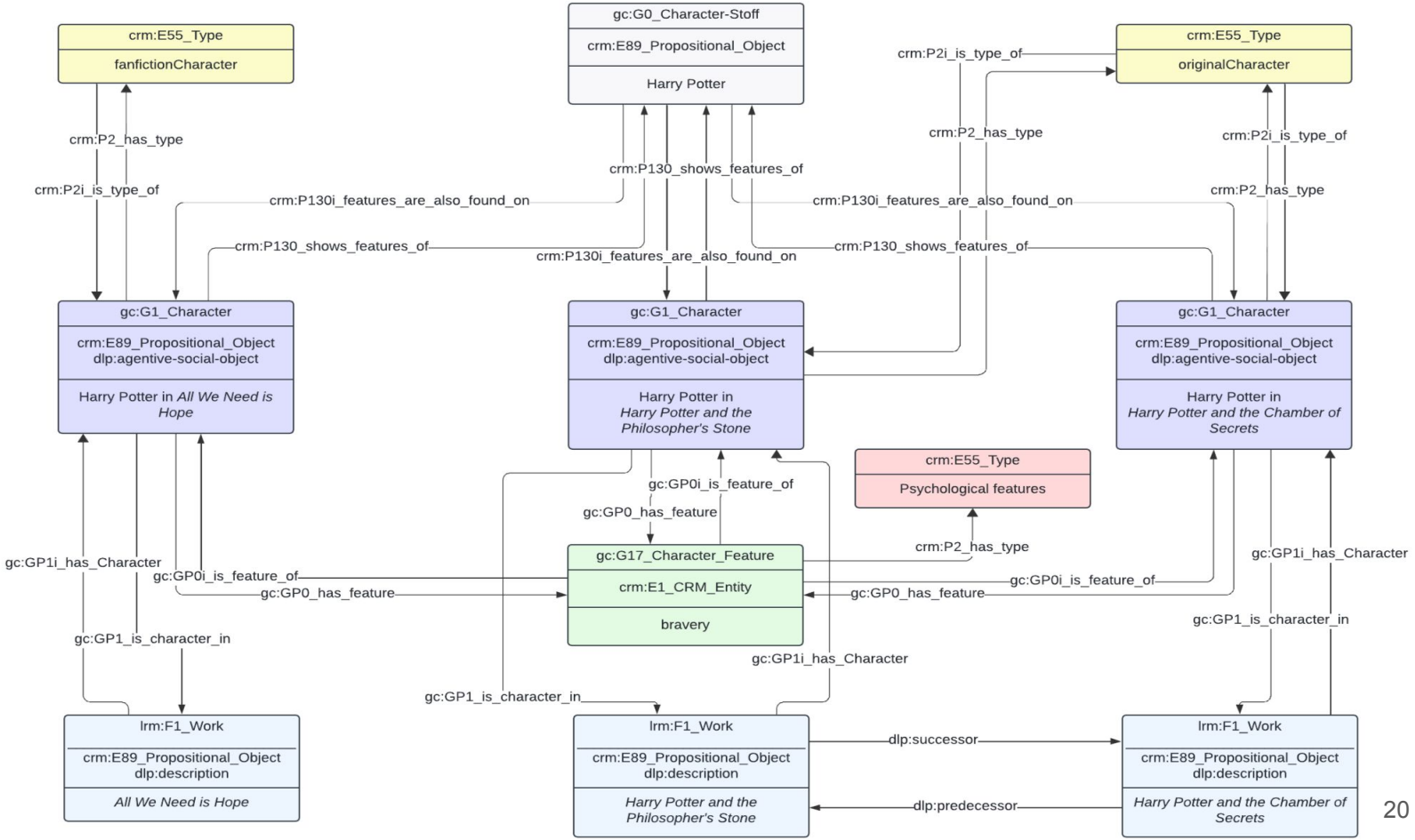
# Character Module



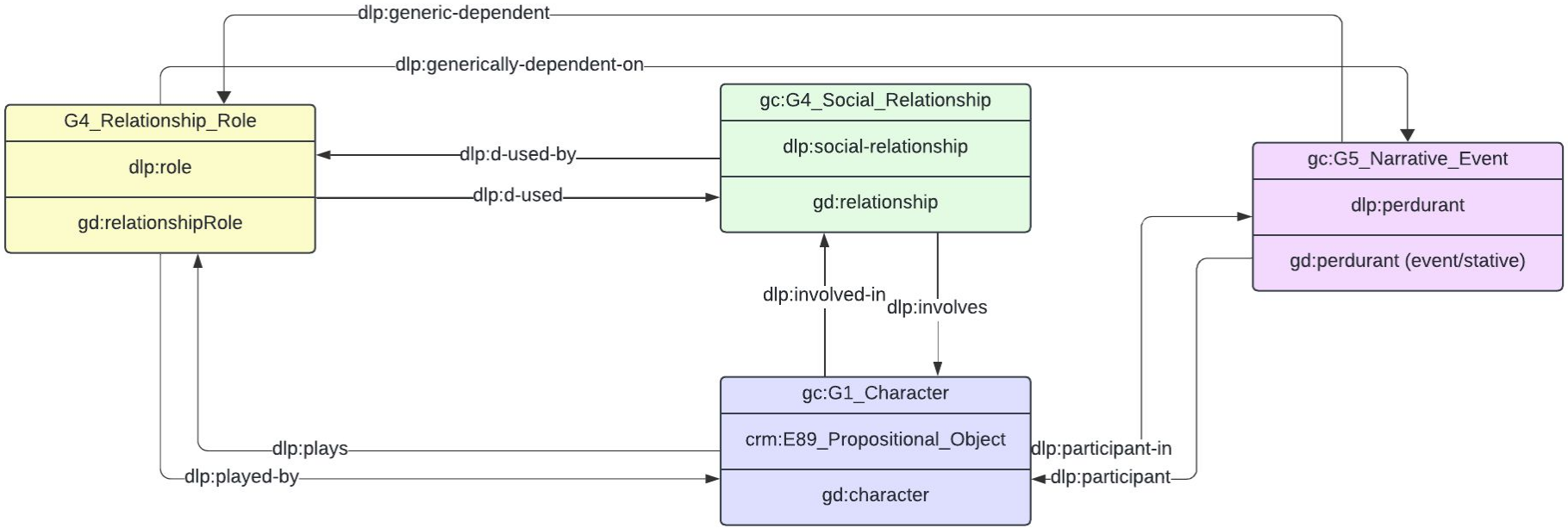
# Character Module



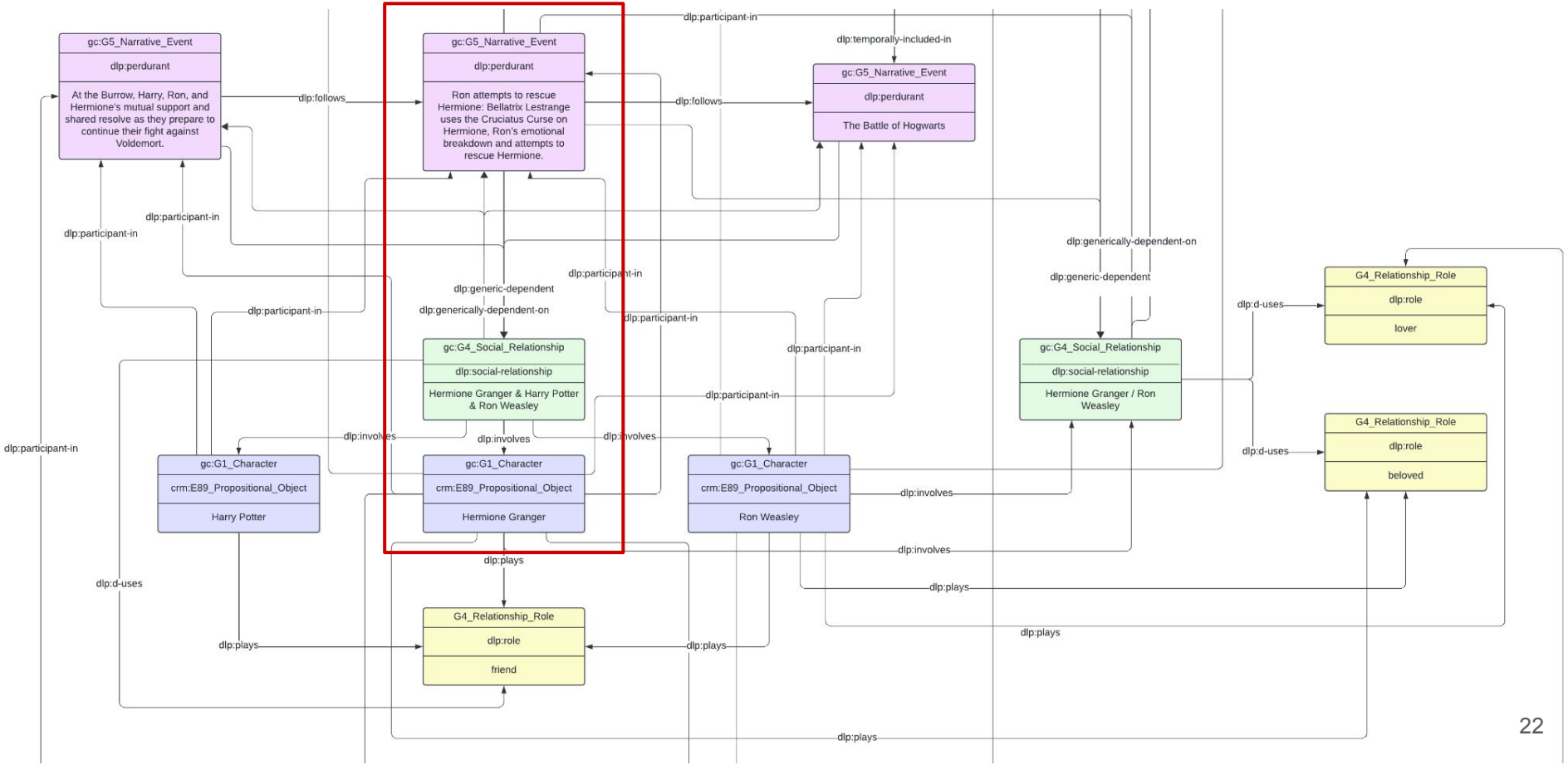
# Character Example



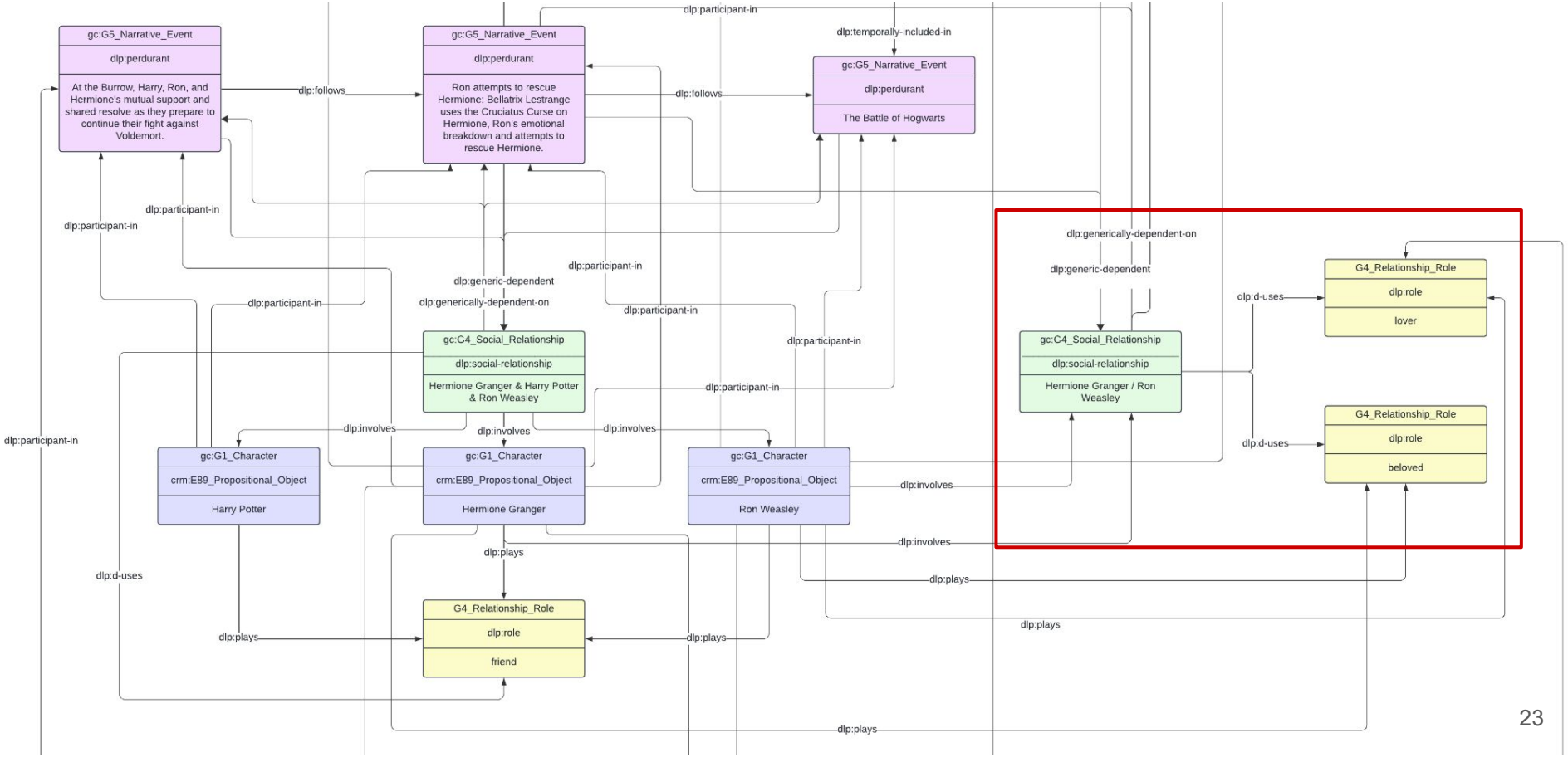
# Relationship Module



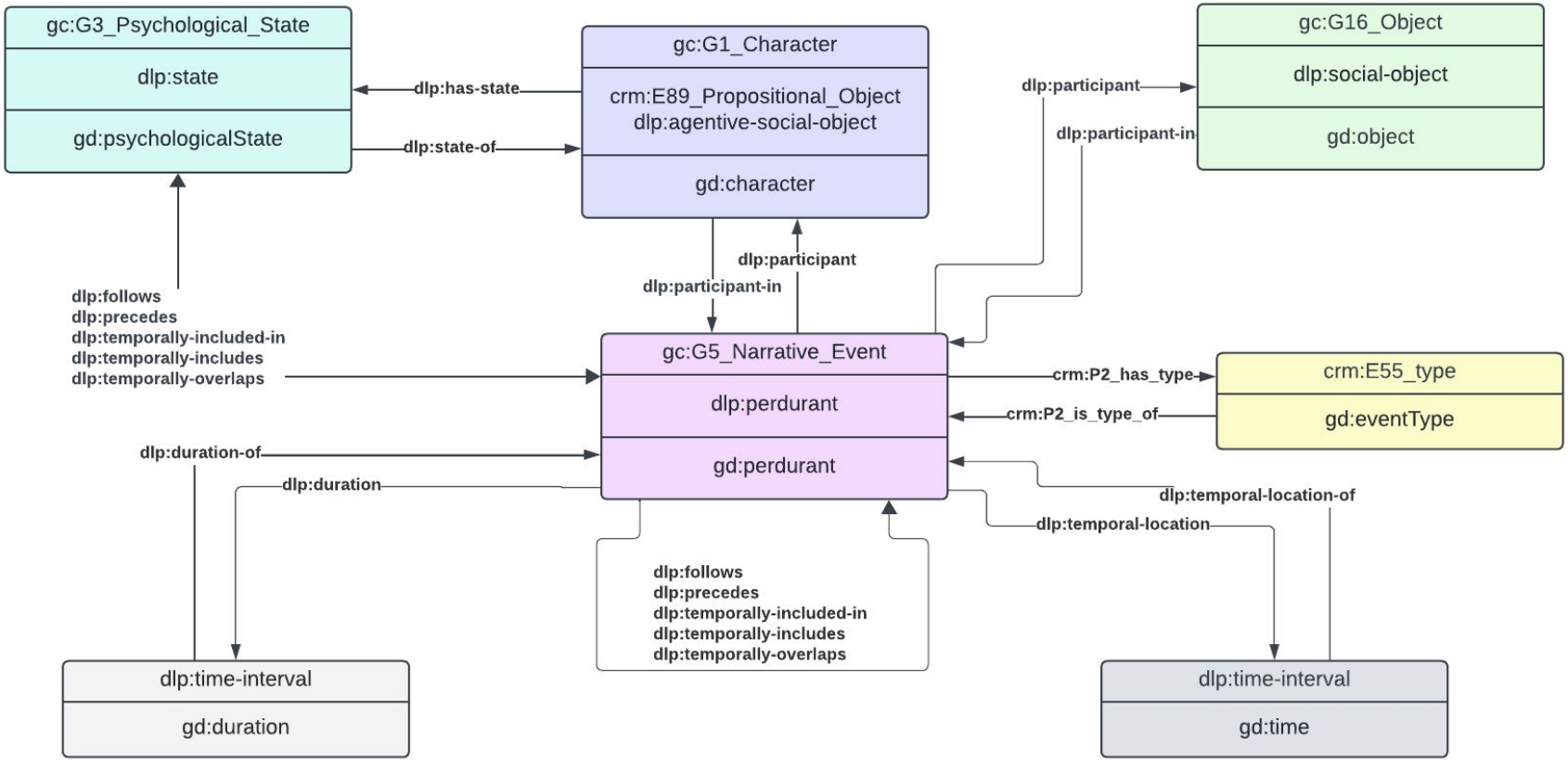
# Relationship Example



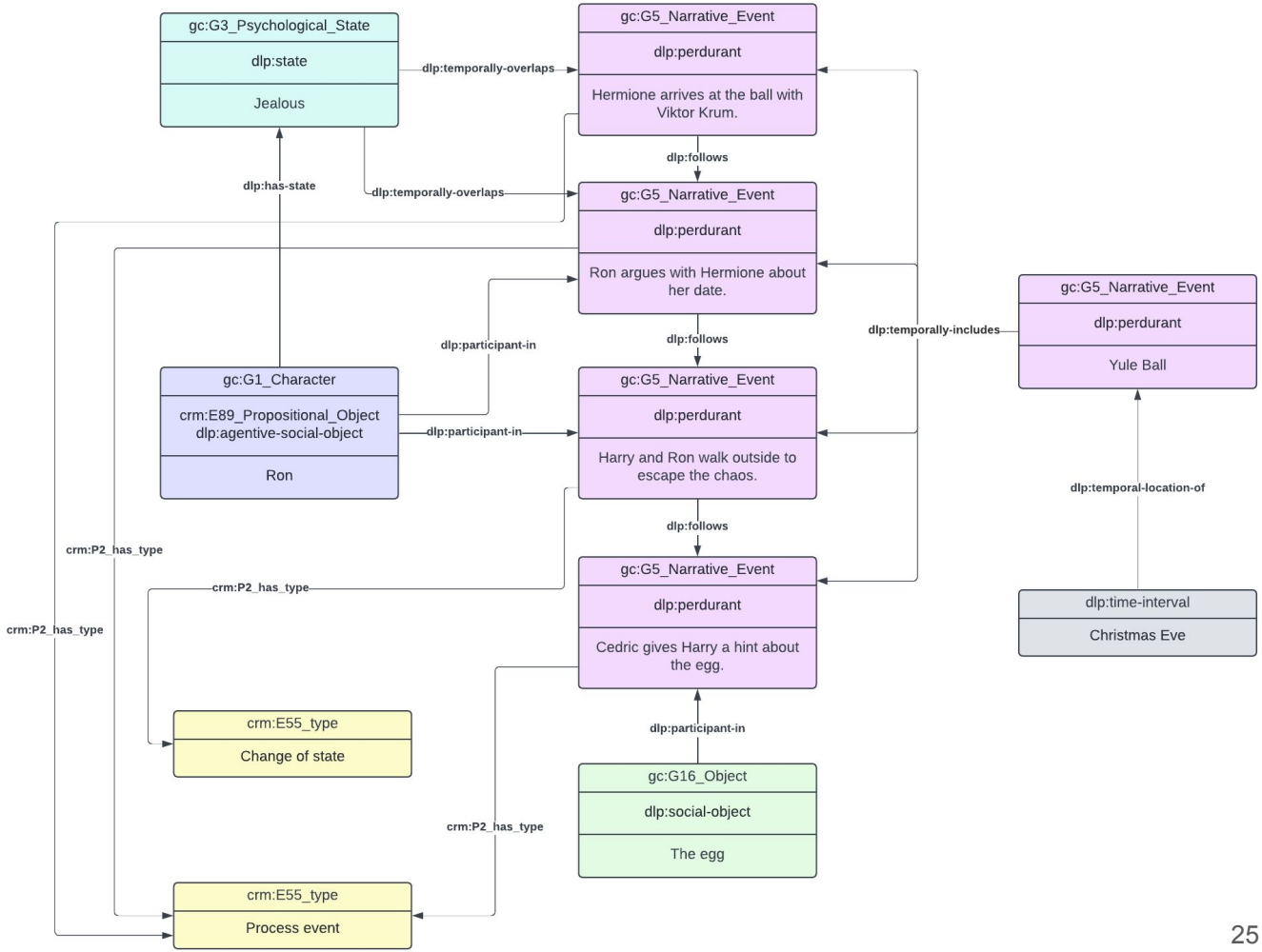
# Relationship Example



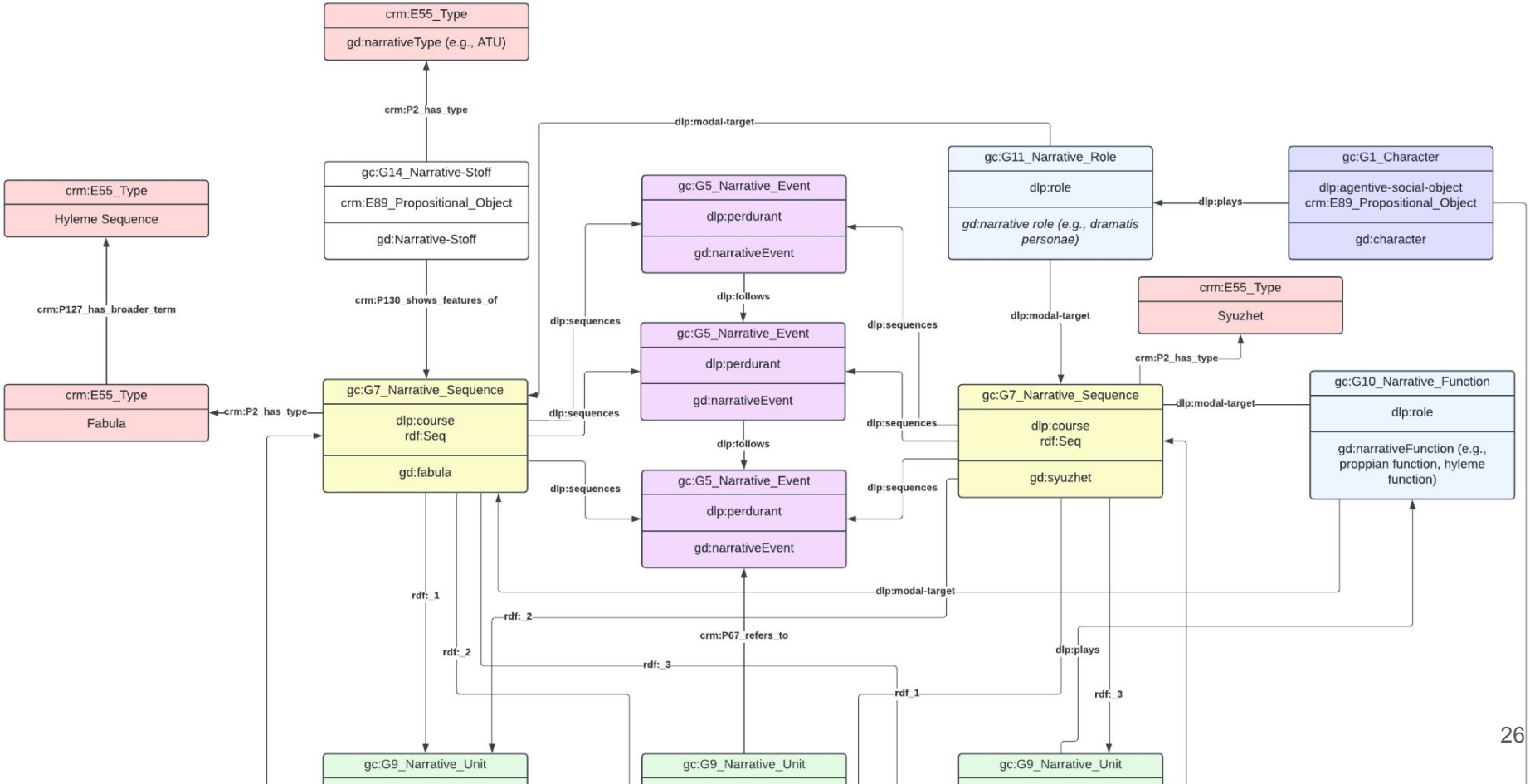
# Event Module



# Event Example



# Narrative Module (1)



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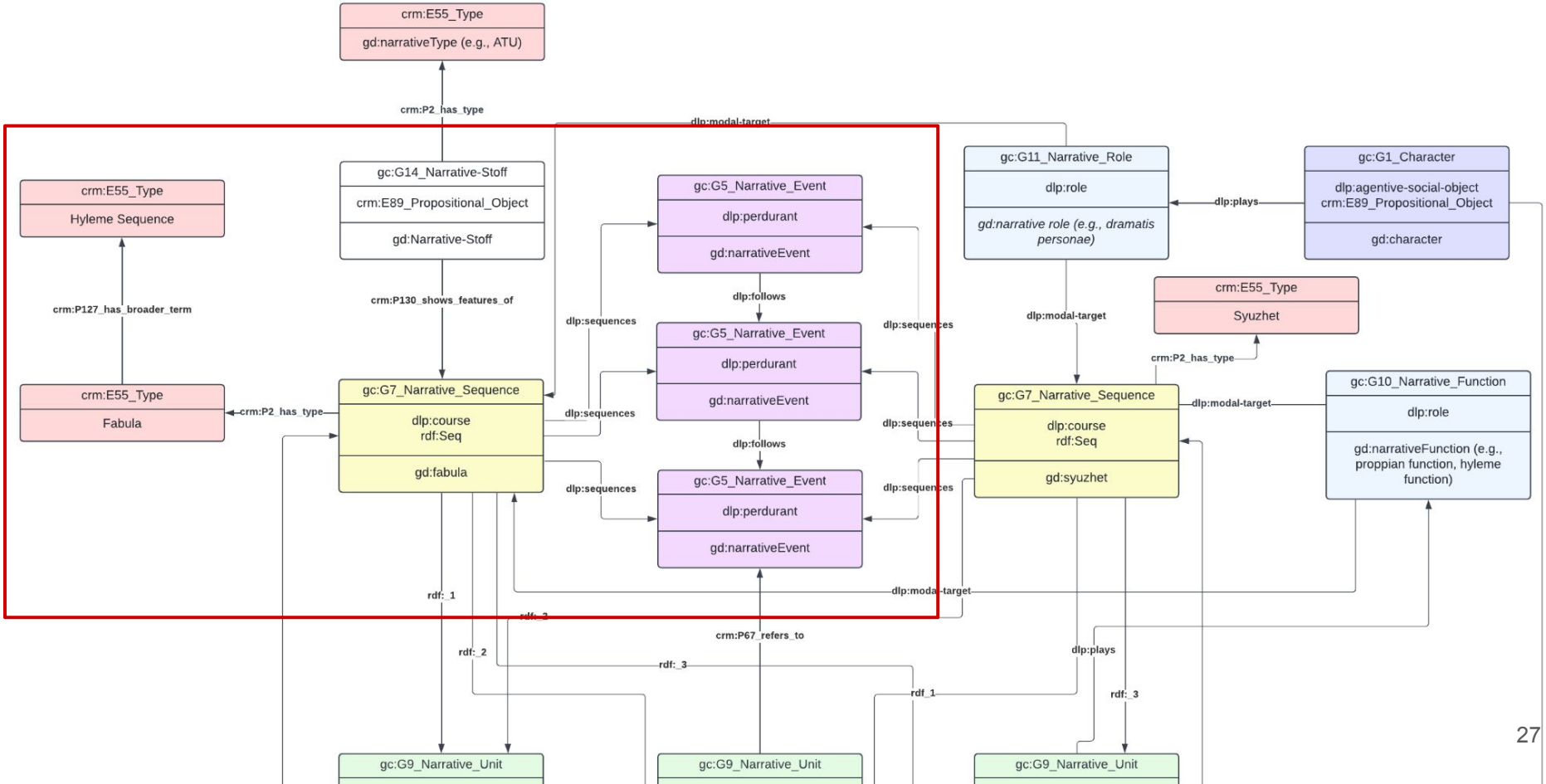
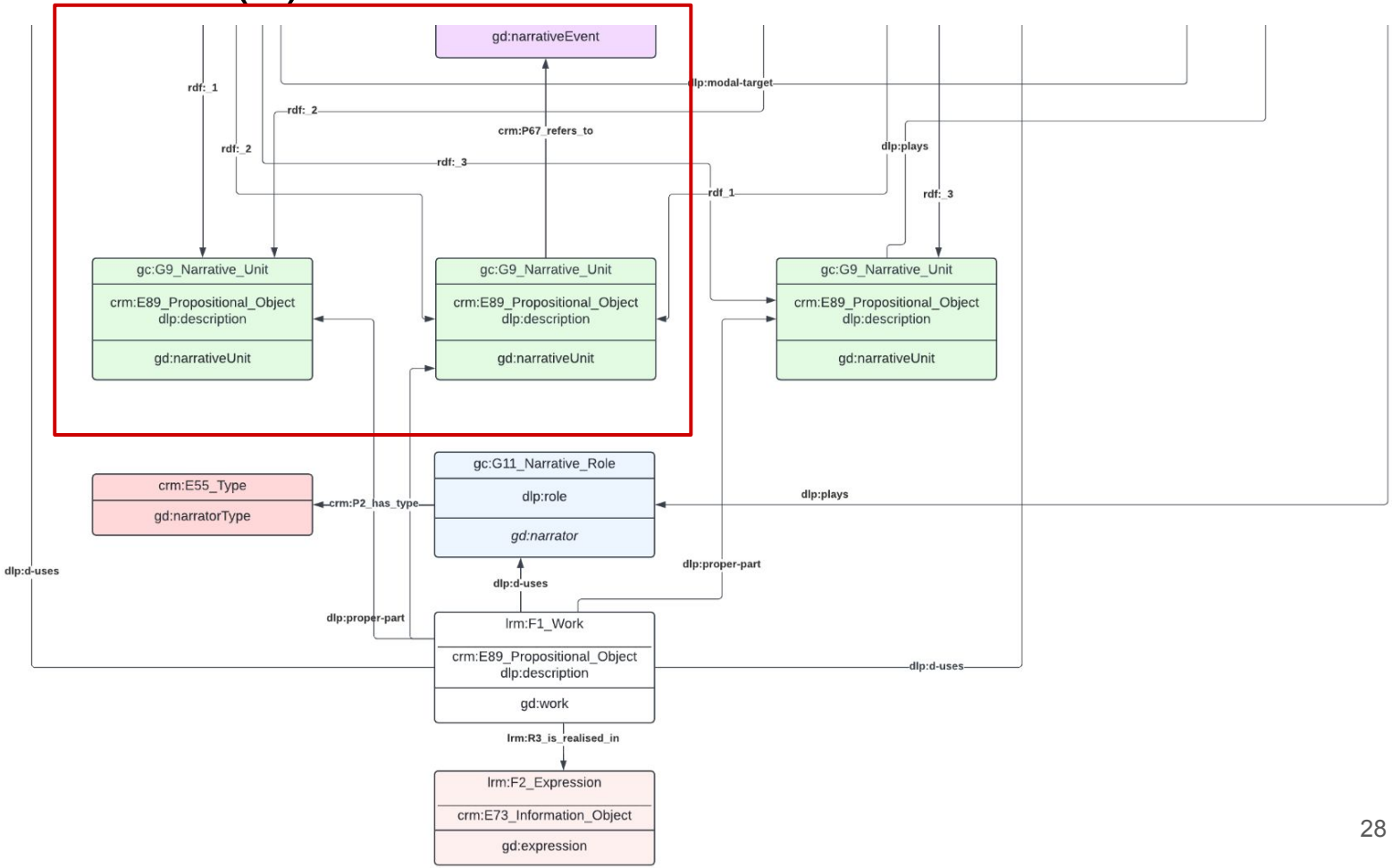
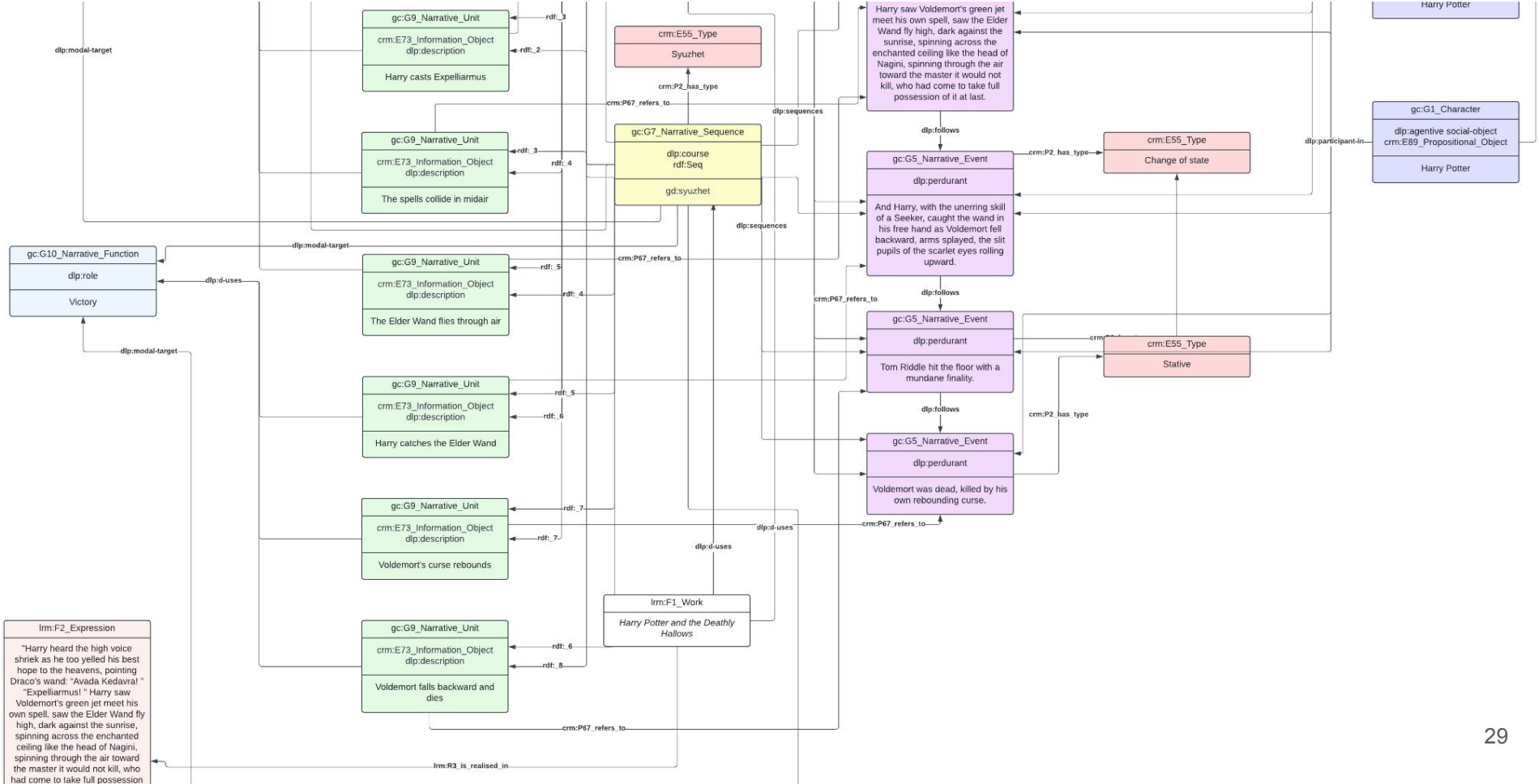


# Narrative Module (2)



# Narrative Example



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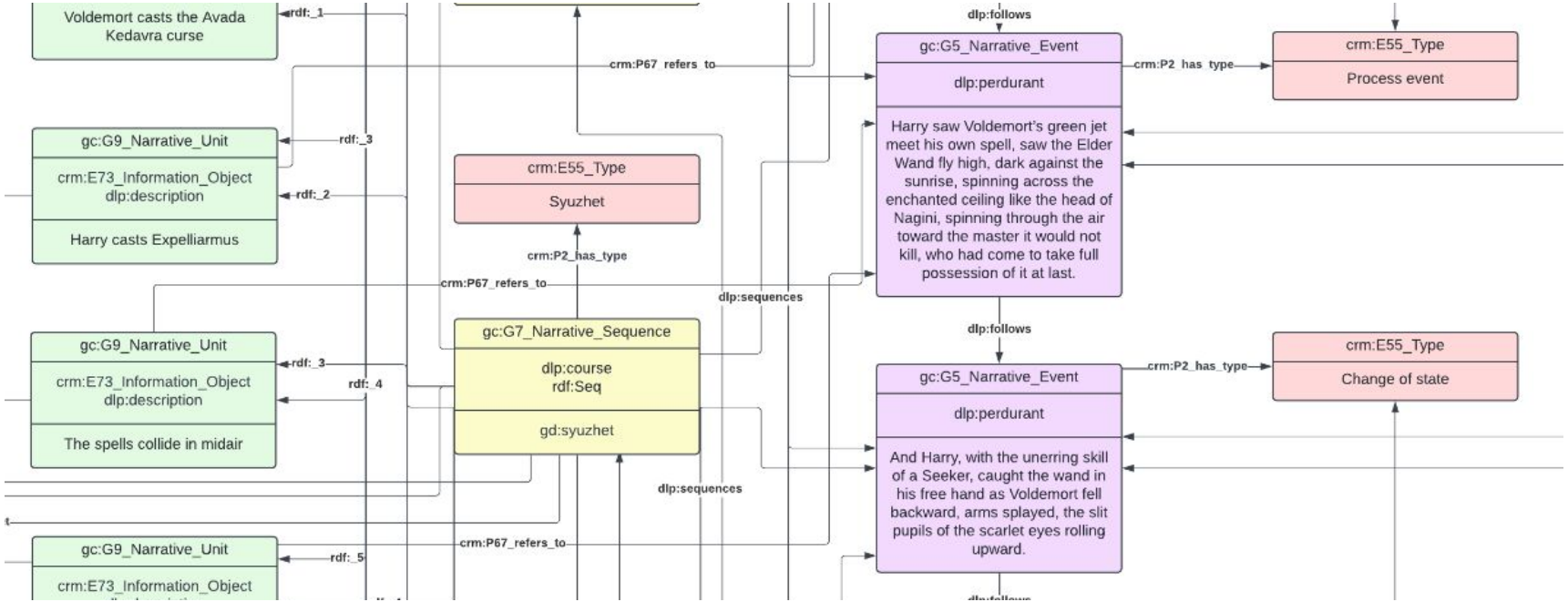
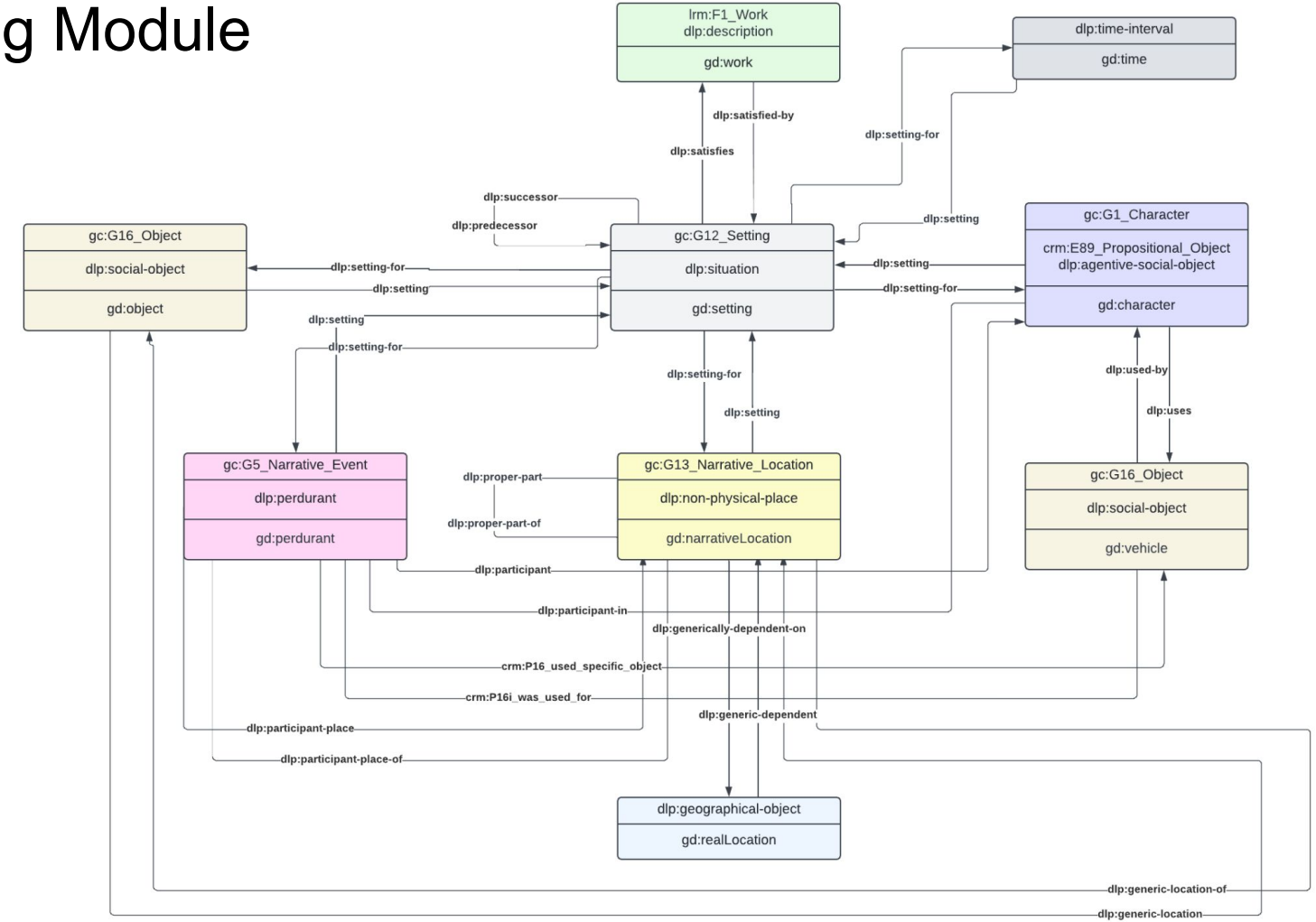
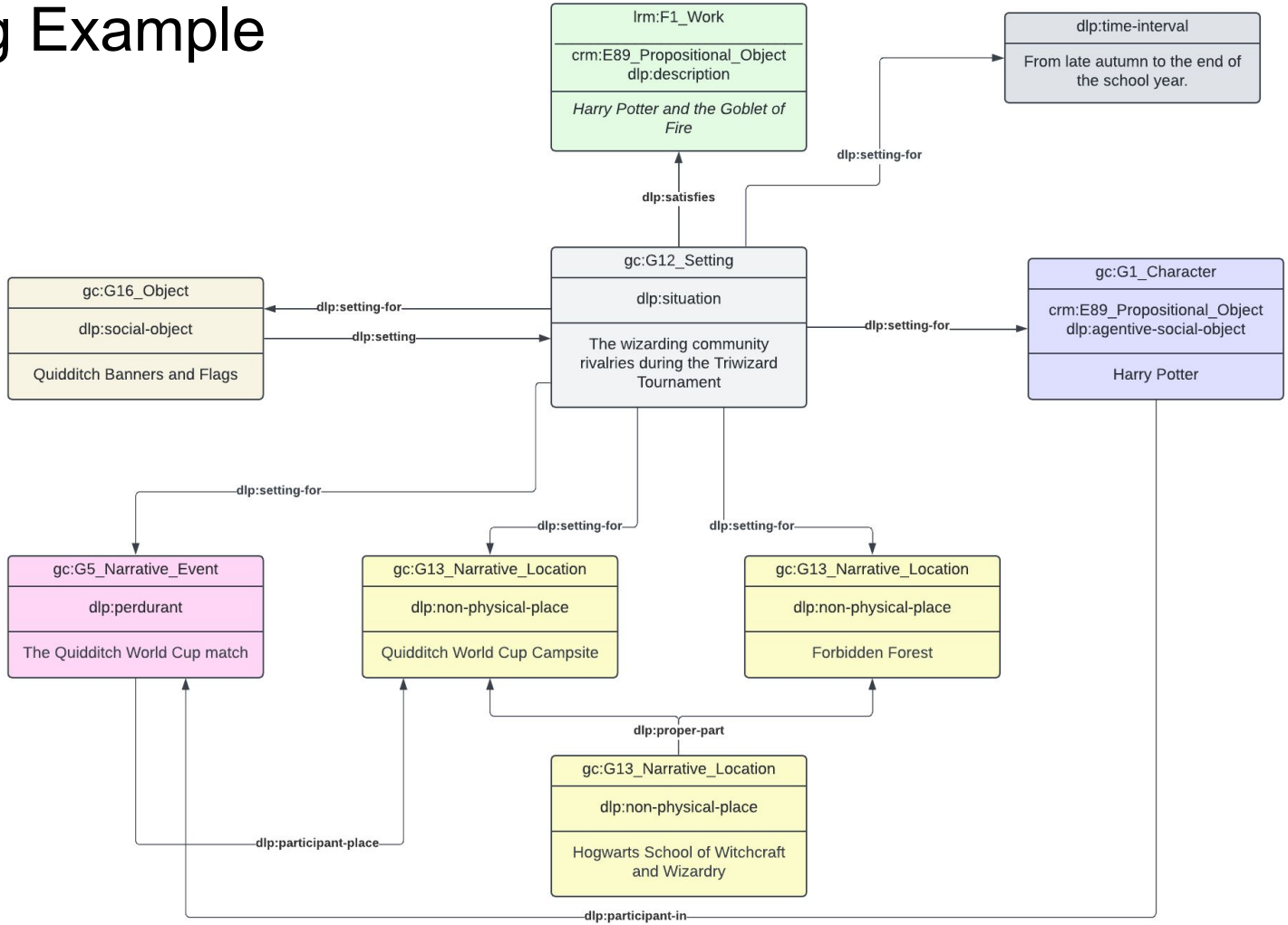


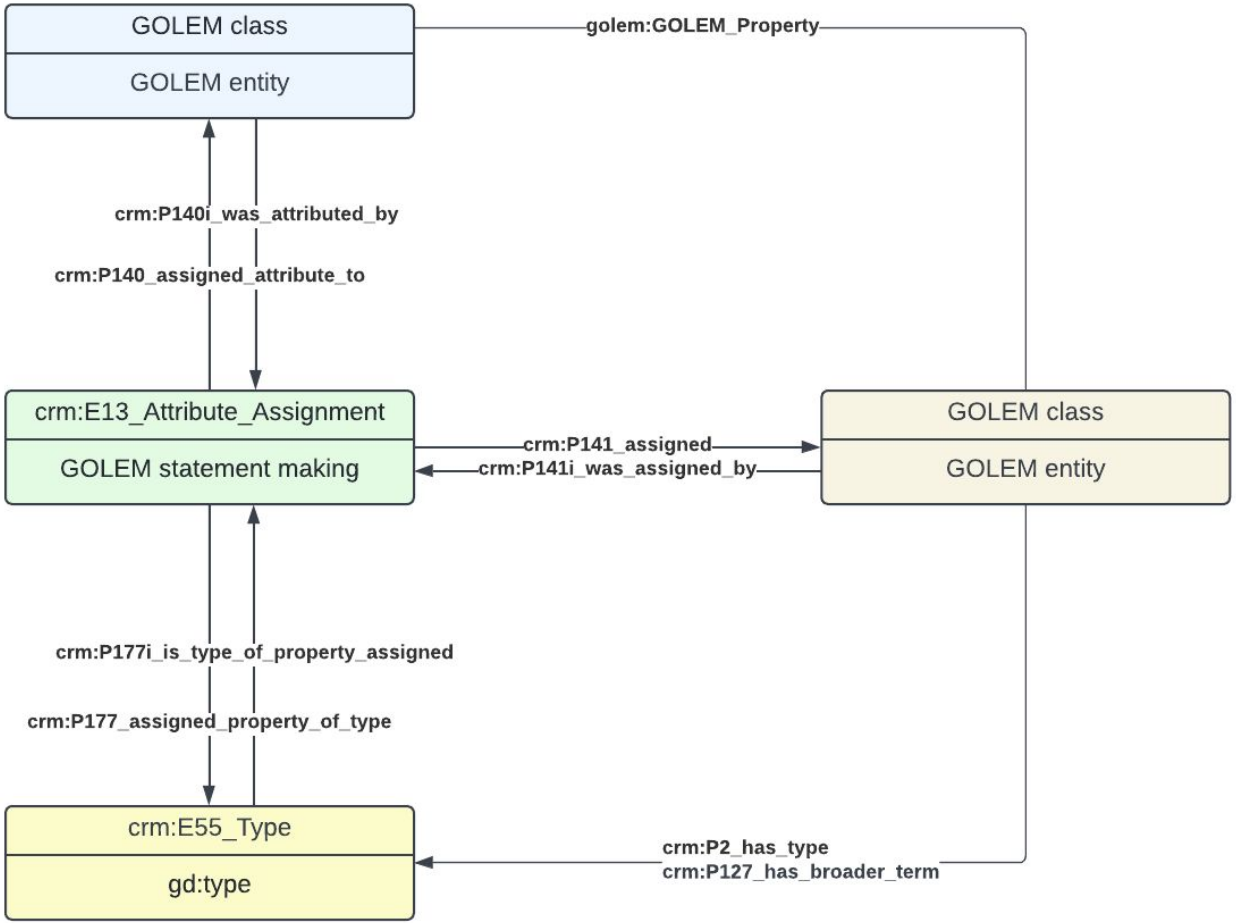
# Setting Module



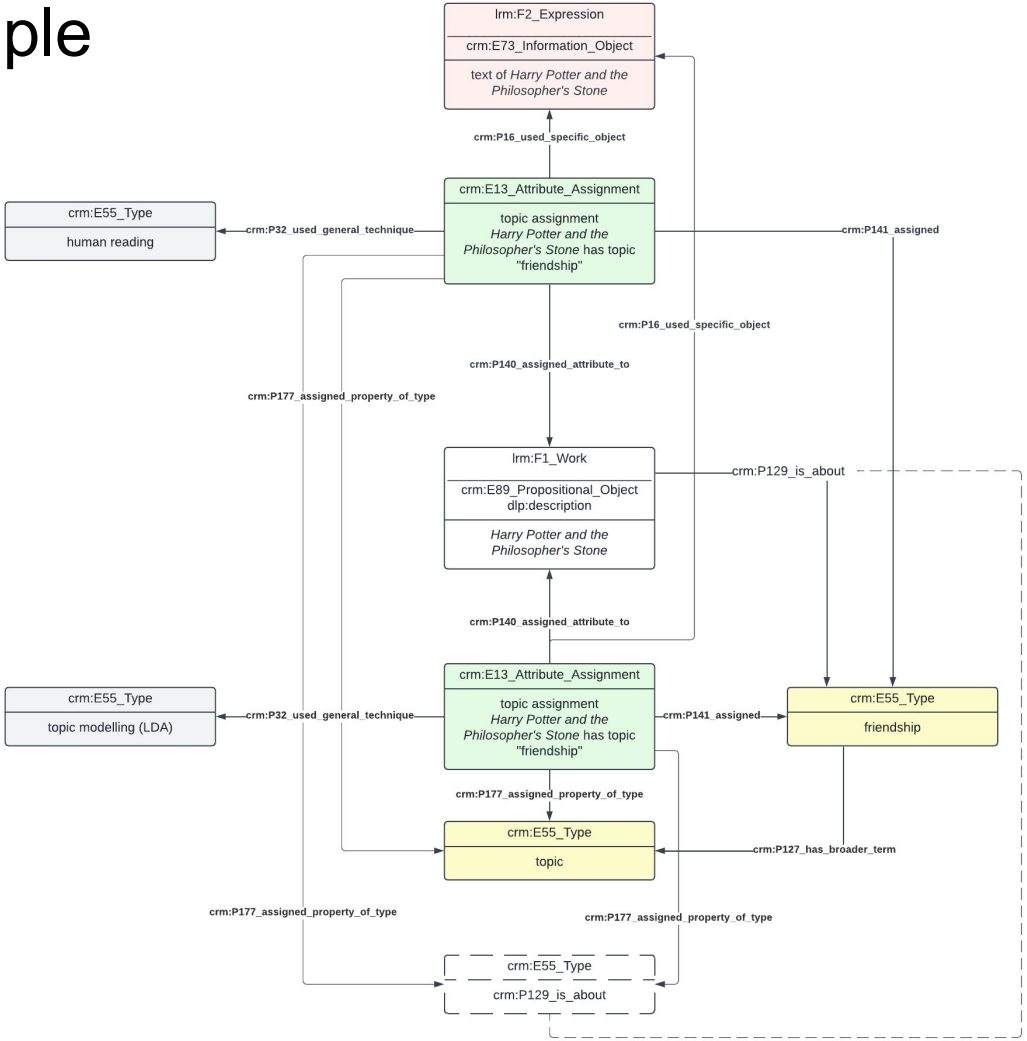
# Setting Example



# Inference Module



# Inference Example



# Ongoing work

- Model more stories according to the GOLEM ontology
- **Reader Response Module**
- Align fandoms with aliases -> Fandoms as *Stoff*
- Character **alignments**, (Character-*Stoff) vs.* Character as present in a story
- **Categorization** of AO3 freeform tags (info about narrative strategies, setting, themes, reader response, author's intentions…)
- **Packaged releases** including DOIs for the ontology

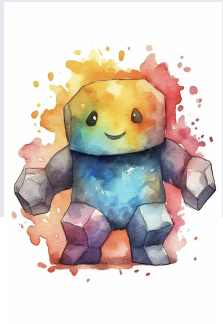
Workshop

# dm4myth

DIGITAL METHODS FOR MYTHOLOGICAL RESEARCH

Co-located with the CHR2024 Conference, in Aarhus Denmark. December 3rd 2024

Know more



# Thanks for your attention!

golemlab.eu
github.com/GOLEM-lab