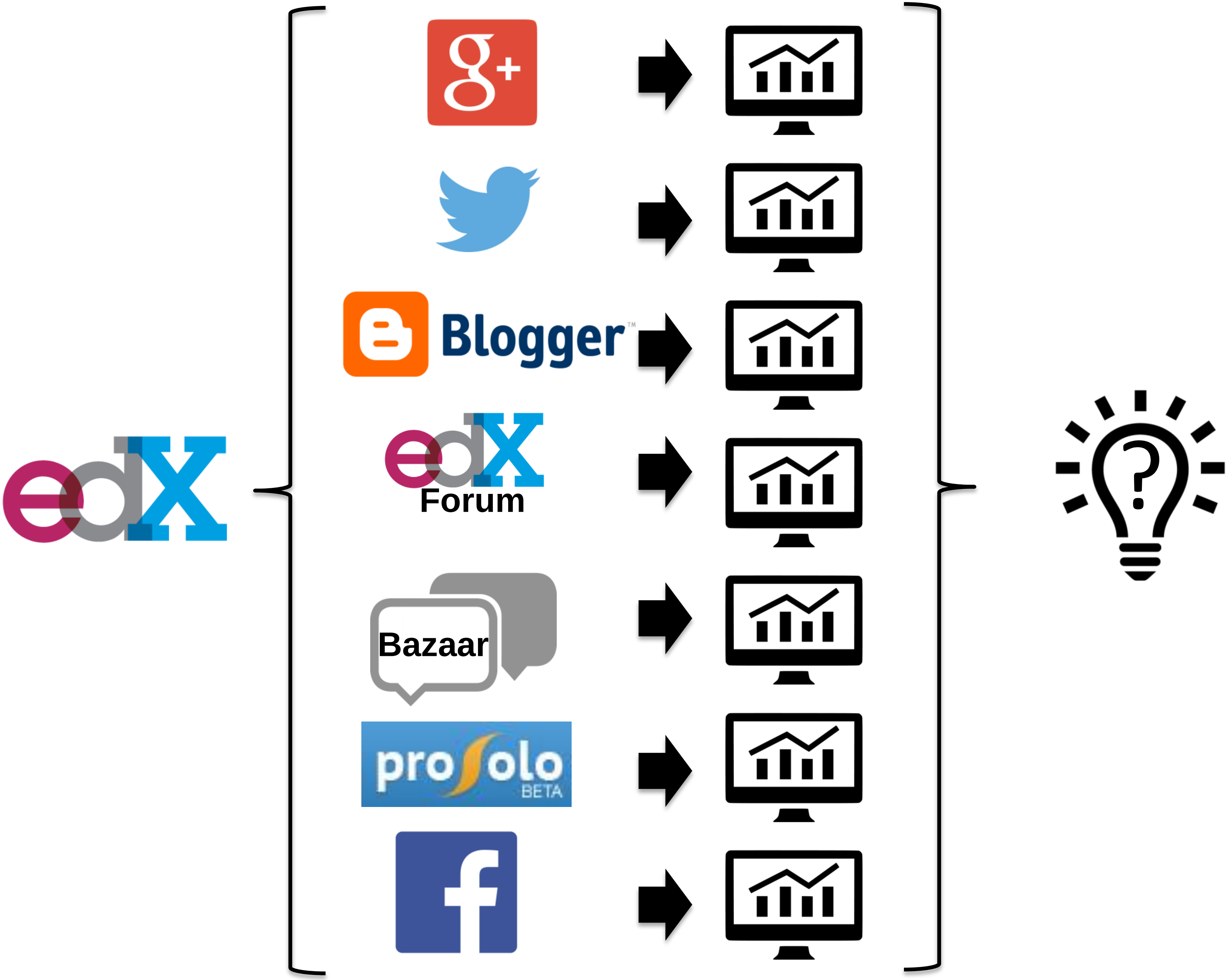
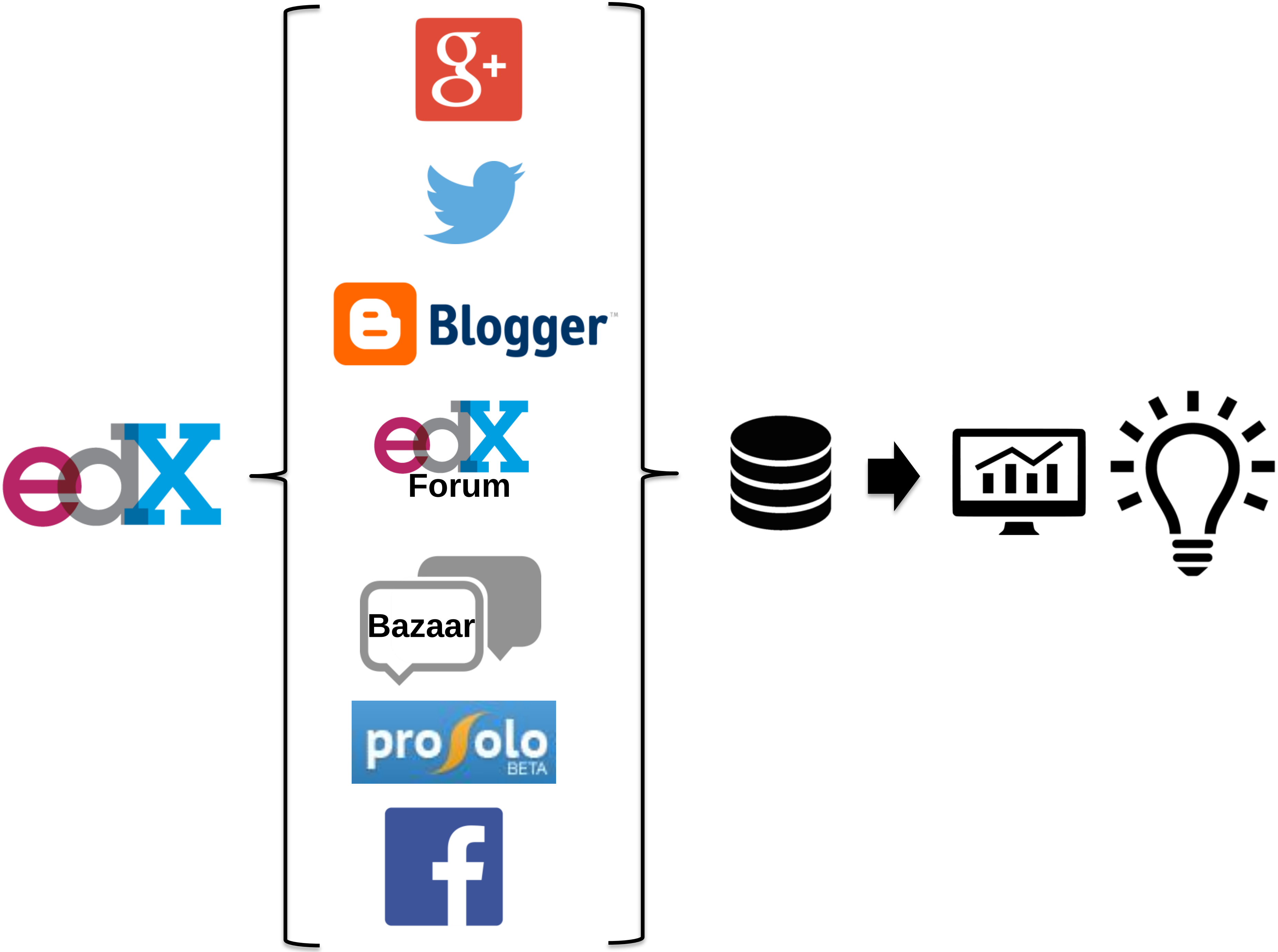
School of Computer Science
Language Technologies Institute

DiscourseDB

Facilitating Cross-Platform Analyses of Educational Discourse


edX
Blogger
edX
Forum
Bazaar
prosolo
BETA



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Forum
Bazaar
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DiscourseDB

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Fusion >

- inference over multiple data sources

Abstraction >

- uniform representation
- simplification helps to form hypotheses
- retention of complexity avoids oversimplification

Contextualization >

- conversational context is key to understanding
- represent multimodal context and synchronize with discussion

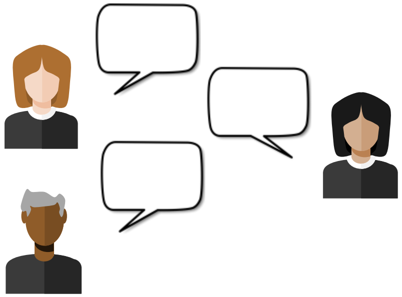
DiscourseDB

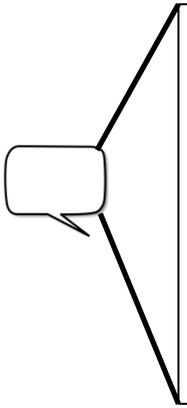
Macro Structure

- network structure of discourse
- integrates content from multiple sources
- keep track of changes over time

Micro Structure

- internal organization of contributions
- linguistic annotation
- content analysis
- multiple layers
- multimodal





Try, try and try again. Here is another selection of fields which captures some areas of CS and which are in the lead paragraph. Unfortunately the text may seem a bit long. Anyone who has any suggestions for a shorter text or objections to this?

Discussion in Context

- Course assignments with a discussion component require an integrated analysis of discussion and context
- Easy in traditional courses
- More loosely structured courses (cMOOCs) more challenging
  - Discussion spread out over platforms
  - Fuzzy boundaries between learning tasks

- **Discussion context is an integral component of DiscourseDB and will enable analyses in weakly structured learning environments.**

Multi-Layer Representation of Discourse

- Discourse is multi-dimensional – different research questions require different views
- Explicit vs. implicit (inferred) discourse structure
- Access and clickstream data to represent “silent” user interactions
  - Reading posts or profiles
  - Following users/threads/pages

Data Source Management

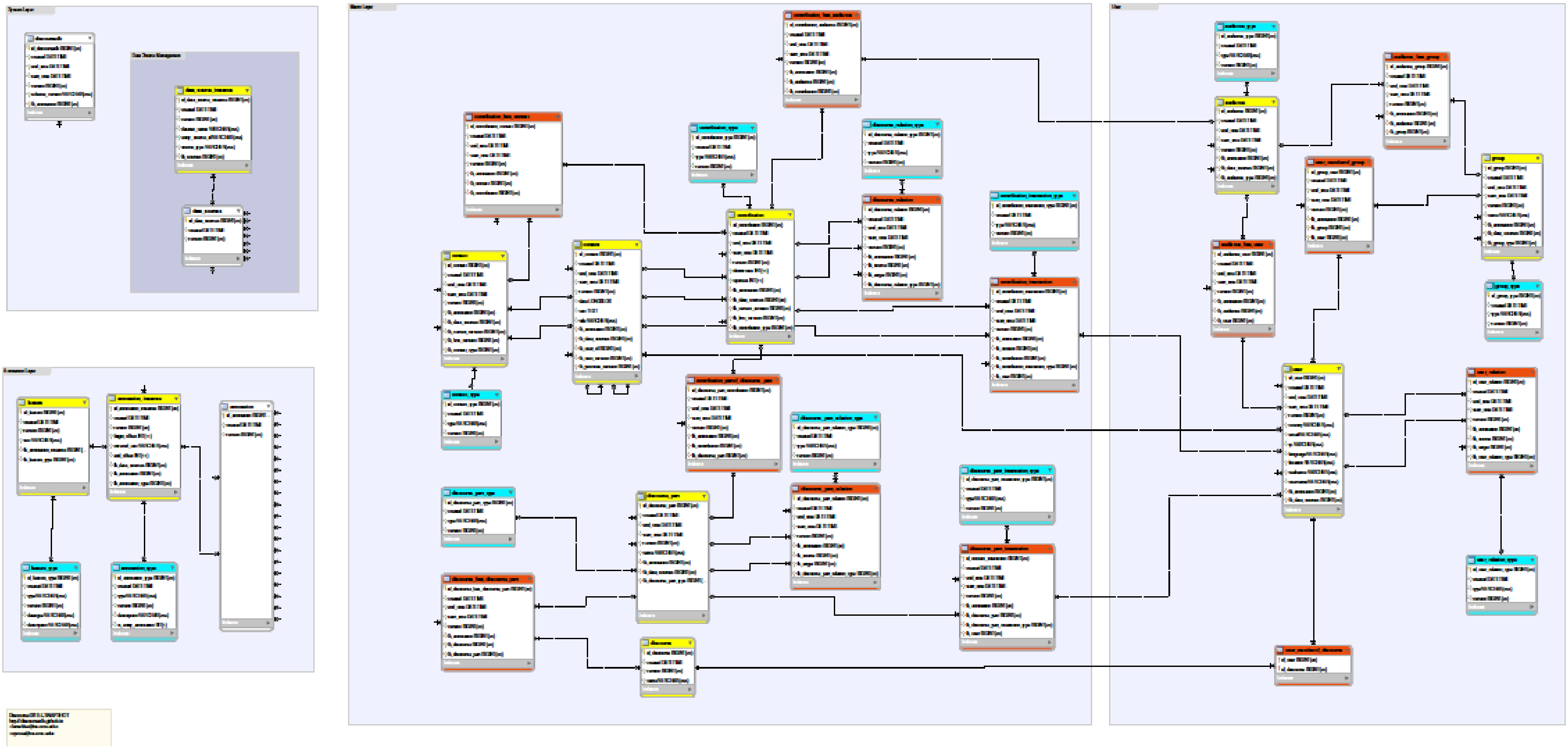
- DiscourseDB unifies discourse data
- BUT: we want to keep track of where each data point came from

➔Necessary at import time in order to make sense of relational data

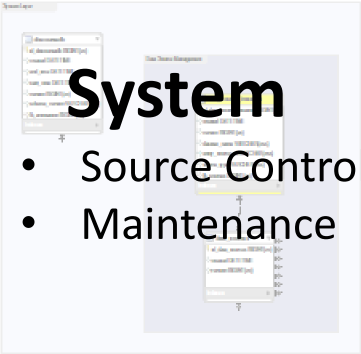
➔Helpful later to recover details that are not explicitly represented in DiscourseDB

Source-controlled **entities in DiscourseDB keep track of where they came from and how the entity can be found in the source.**

SCHEMA

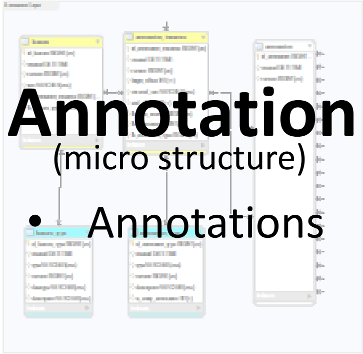


DiscourseDB Layers



System

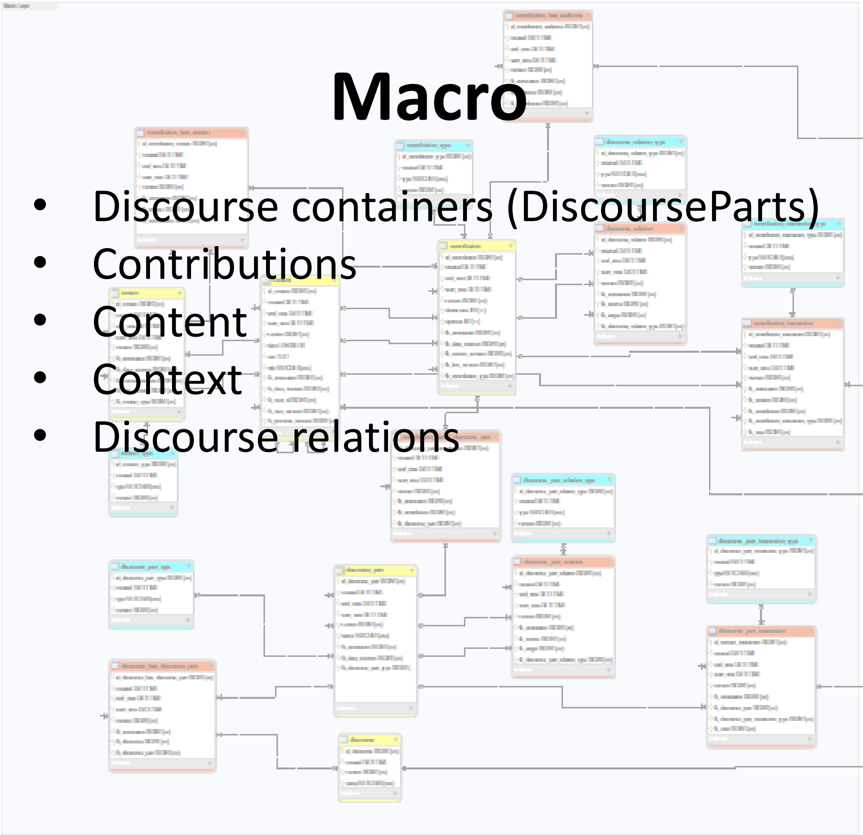
- Source Control
- Maintenance



Annotation

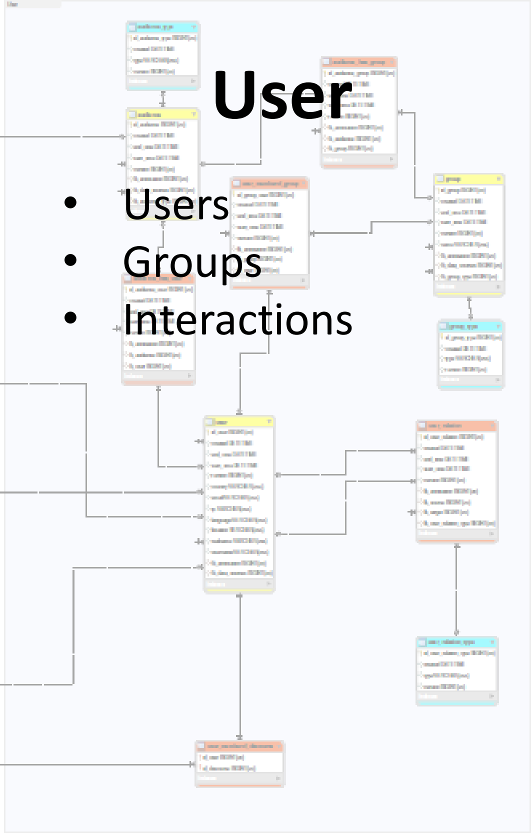
(micro structure)

- Annotations



Macro

- Discourse containers (DiscourseParts)
- Contributions
- Content
- Context
- Discourse relations



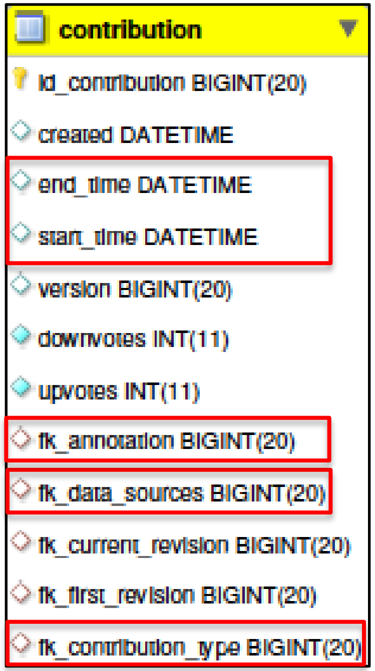
User

- Users
- Groups
- Interactions

DiscourseDB Entity Properties

aka “entity capabilities”

- Timed entities
  - – start date
  - – end date
- Annotatable entities
  - – set of annotations
- Source controlled entities
  - – set of data sources
- Type entities
  - – tied to a non-type entities



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upvotes INT(11)
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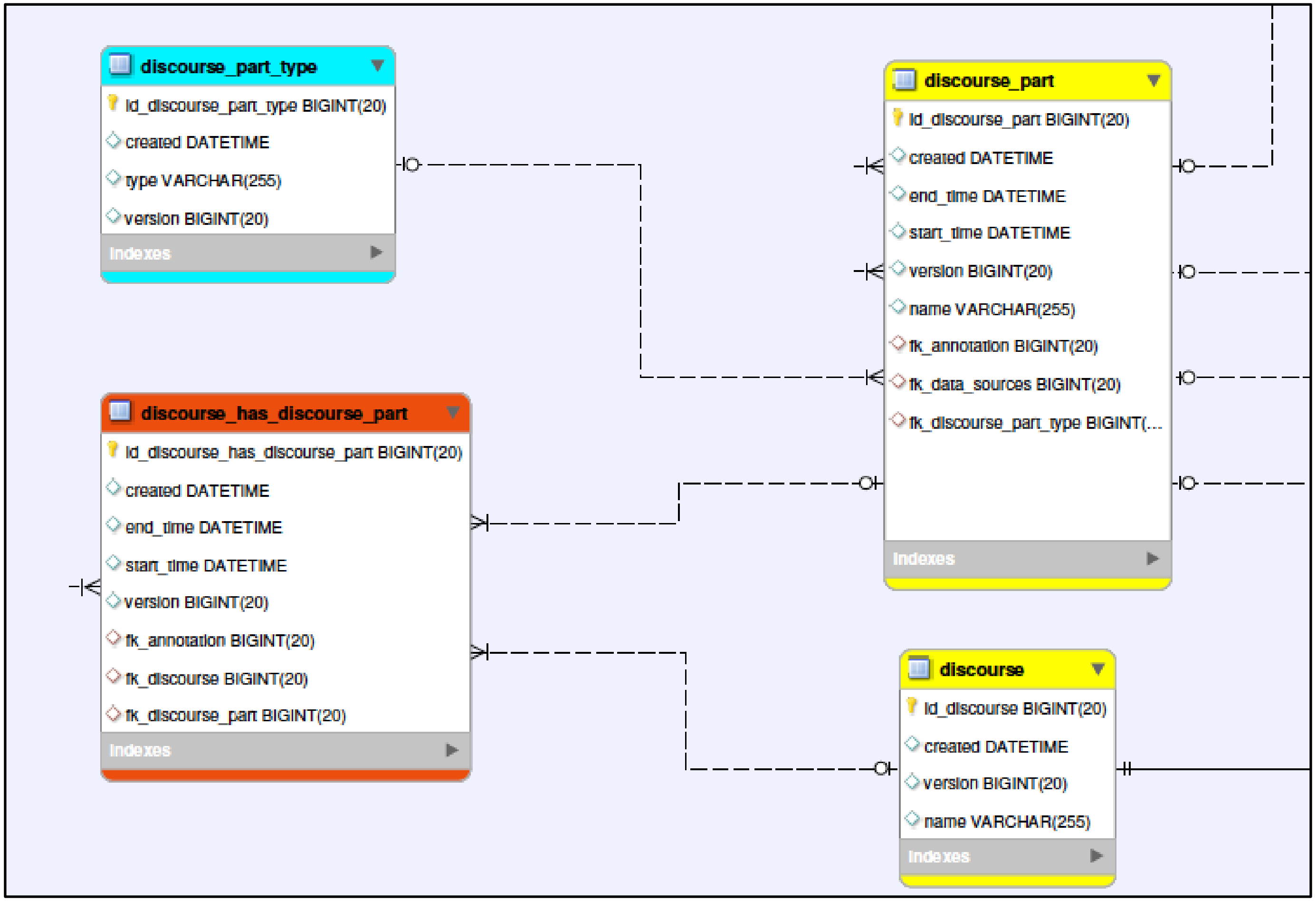
fk_data_sources BIGINT(20)
fk_current_revision BIGINT(20)
fk_first_revision BIGINT(20)
fk_contribution_type BIGINT(20)

Central Entities

- Discourse
- DiscoursePart
- Contribution
- Context
- Content
- User

Discourse and DiscoursePart



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- Indexes

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- Indexes

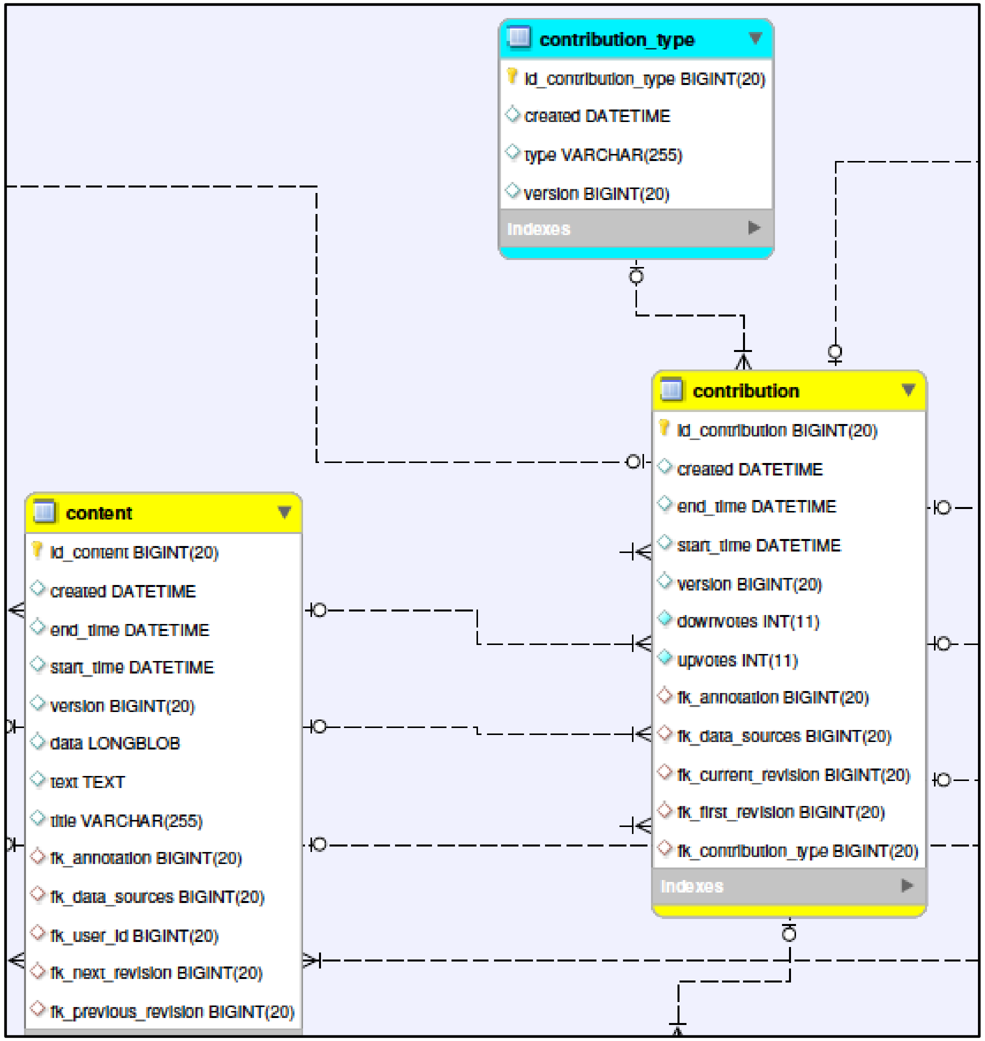
DISCOURSE

- COURSE INSTANCE
- WIKIPEDIA INSTANCE
- EXPERIMENT

DISCOURSE PART

- FORUM
- SUBFORUM
- THREAD
- TALK PAGE
- BLOG

Contribution/Content



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Indexes

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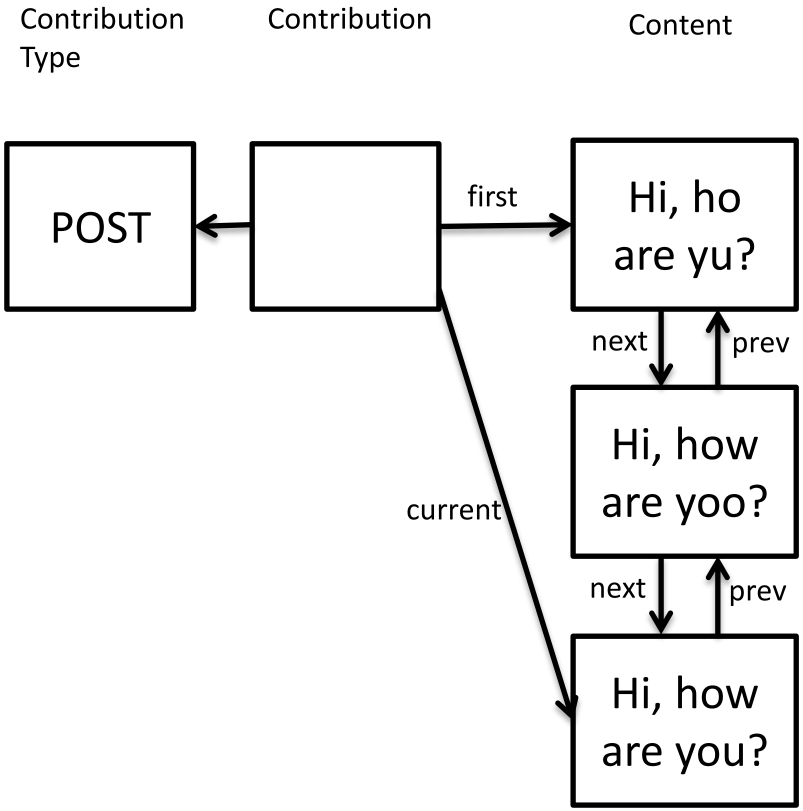


Contribution Type

Contribution

Content

POST

first

Hi, ho are yu?

next

prev

Hi, how are yoo?

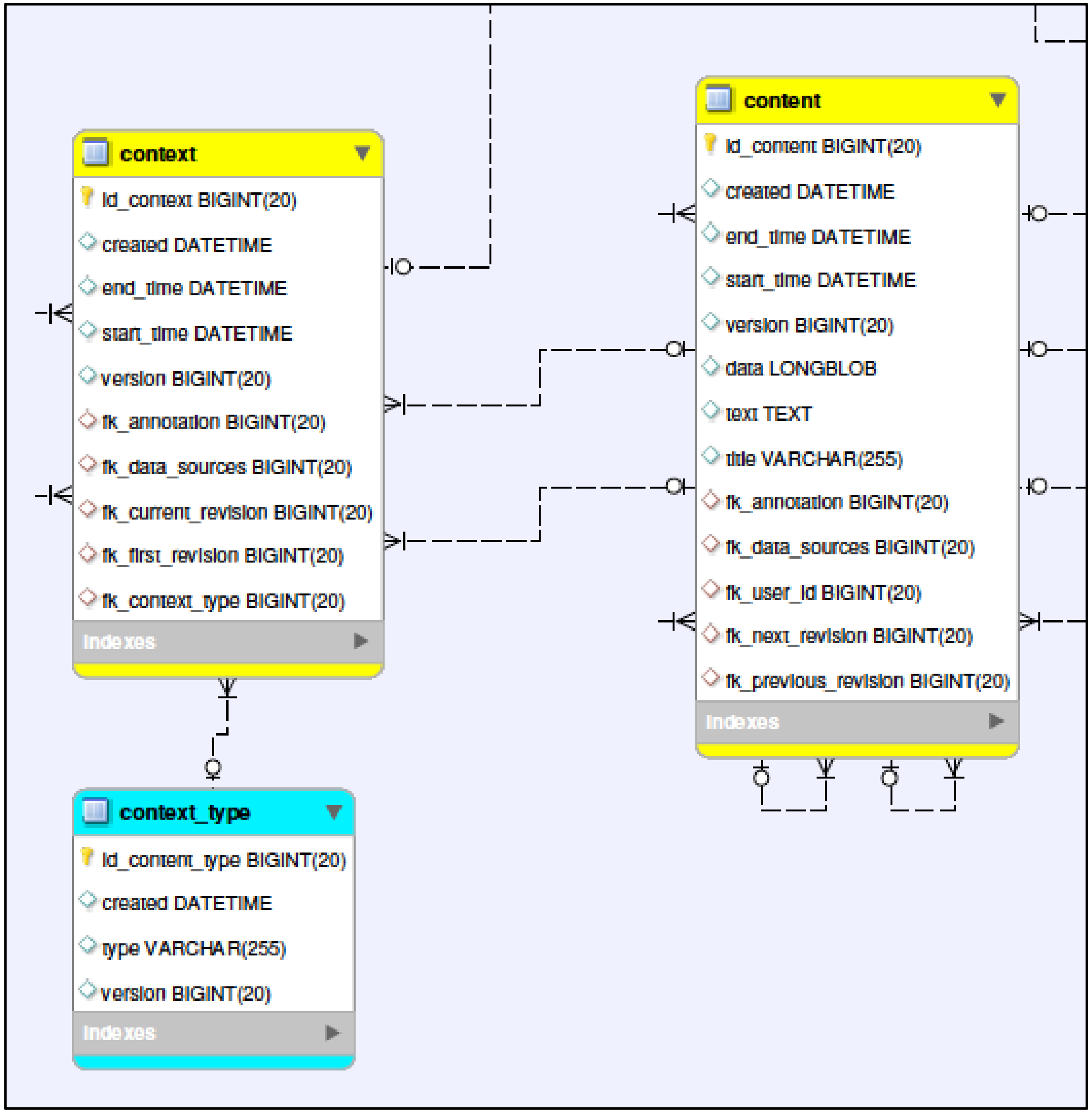
current

next

prev

Hi, how are you?

Context



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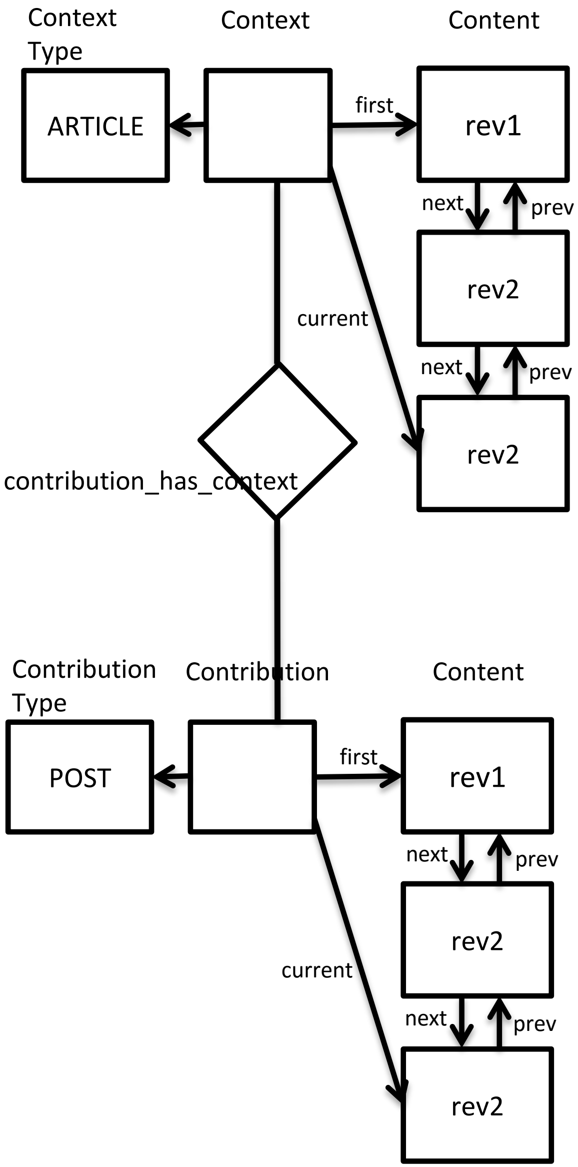
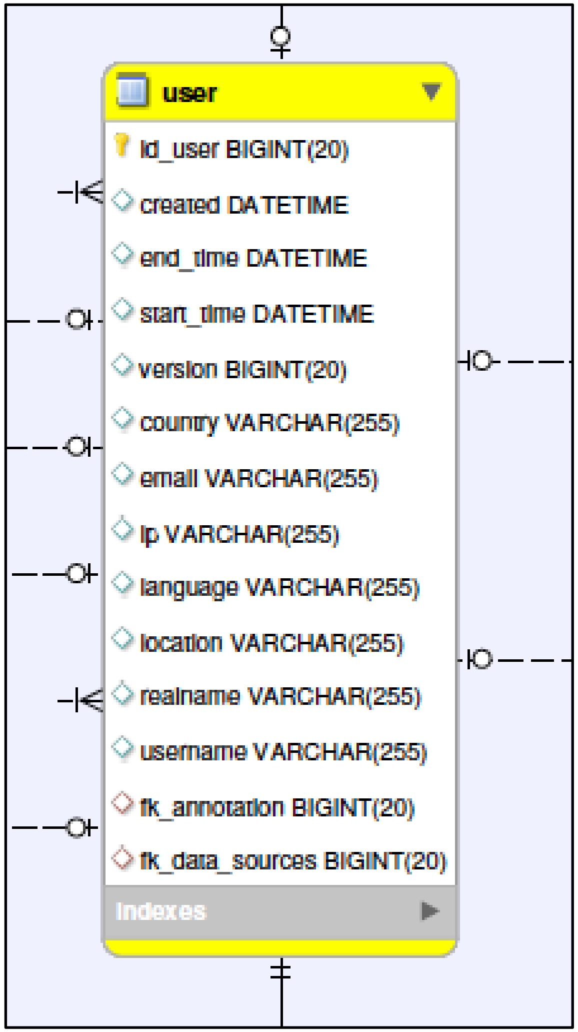


User



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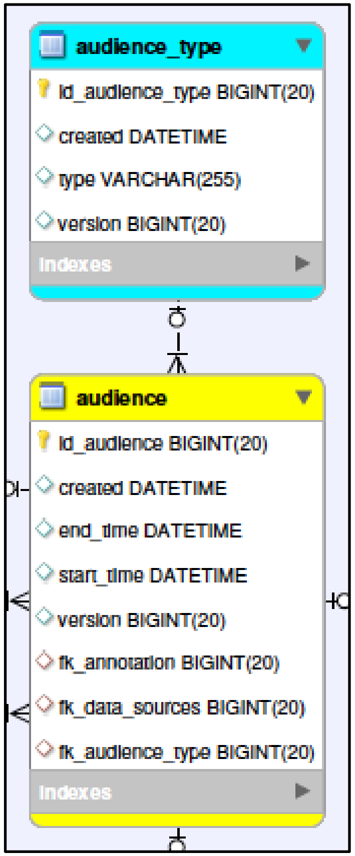

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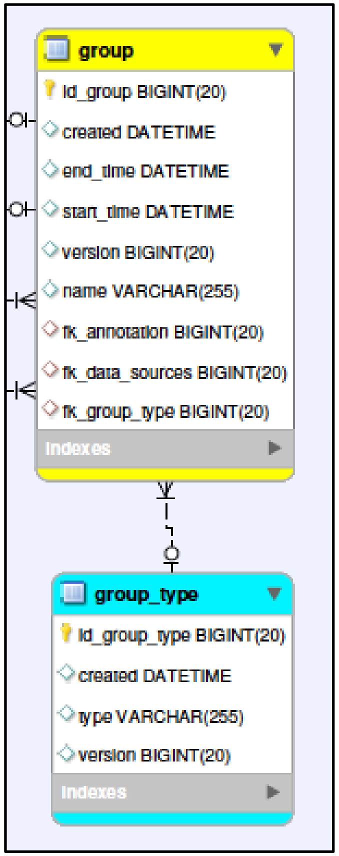

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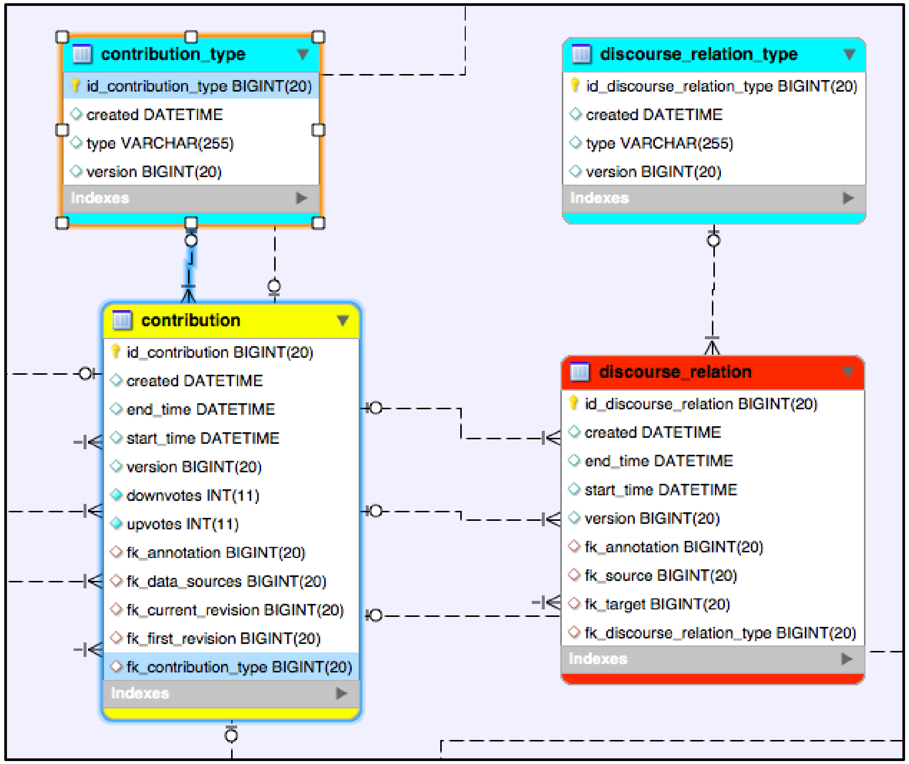
Central Relations

- DiscourseRelation
- DiscoursePartRelation
- DiscoursePartInteraction
- ContributionInteraction

Discourse(Part)Relation



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Indexes

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upvotes INT(11)
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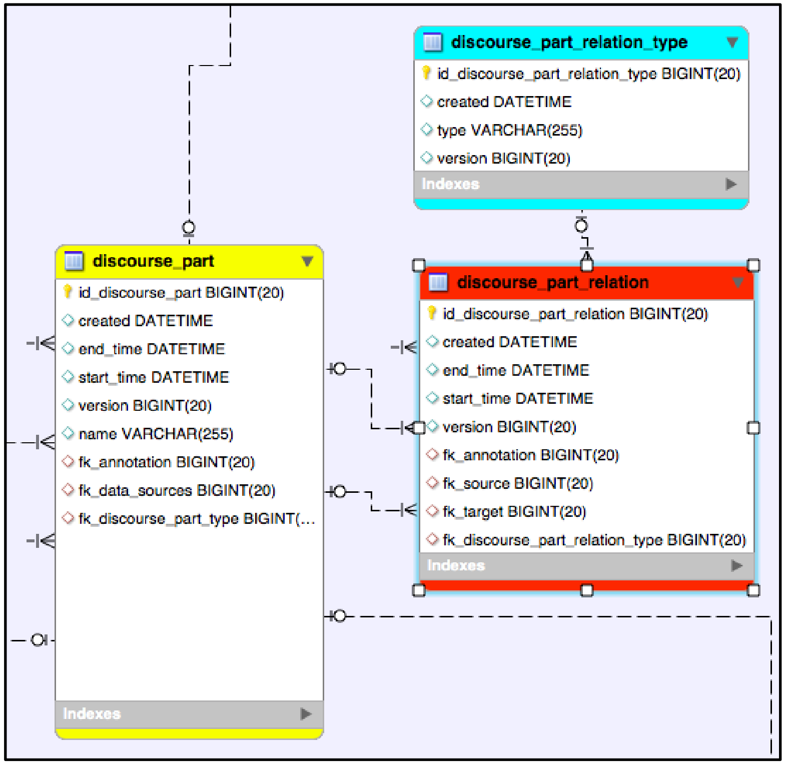

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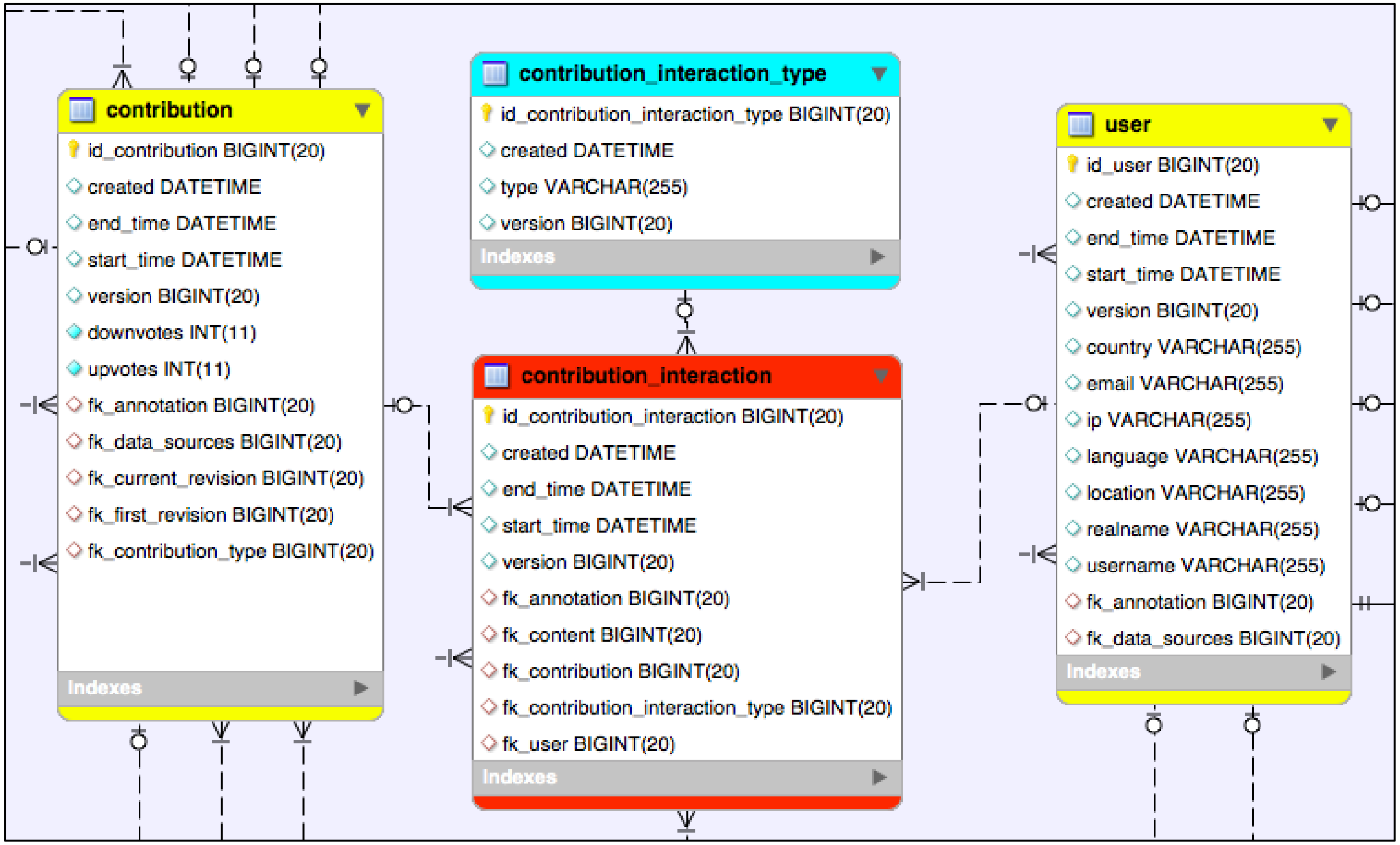
Indexes

- Reply
- Descendant
- Comment
- Reshare

- TalkPageDiscussion
- SubForum

Interactions



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Indexes

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Indexes

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Indexes

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- username VARCHAR(255)
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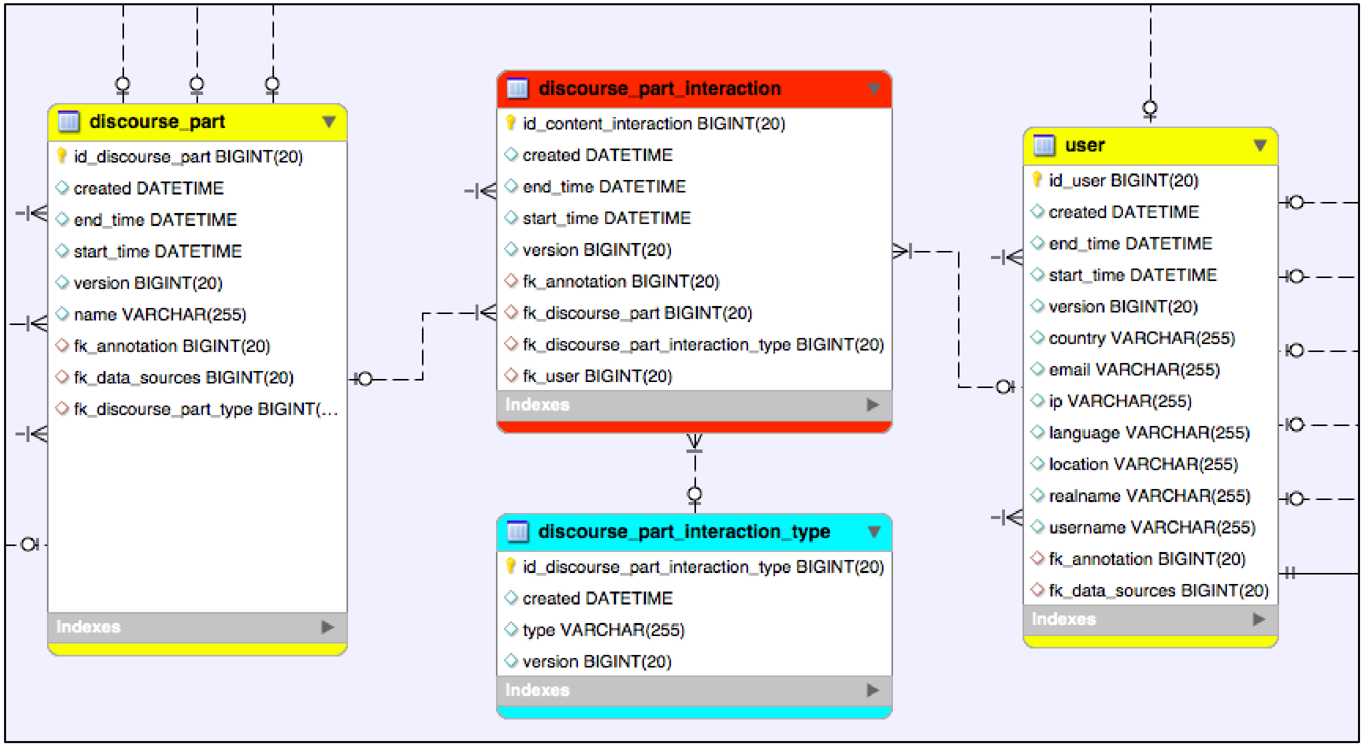
Indexes

- Read
- Follow
- Delete
- Revert
- Share

Interactions



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Indexes

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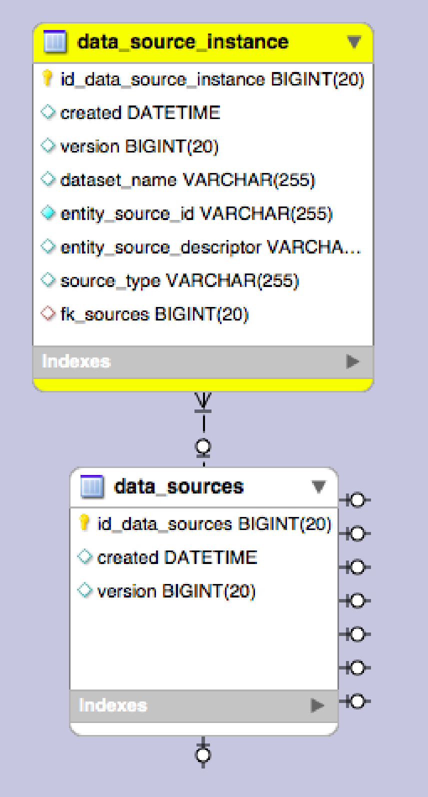
fk_data_sources BIGINT(20)
Indexes

- Join
- Ready
- Leave

Data Source Management



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Indexes

data_sources

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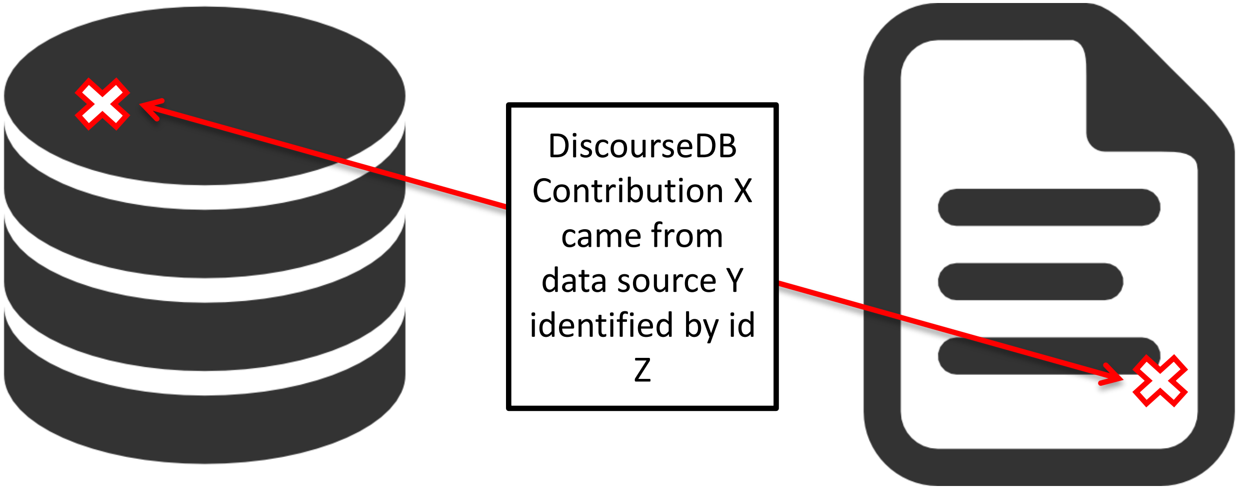
- version BIGINT(20)

Indexes

We want to keep track of where imported data came from

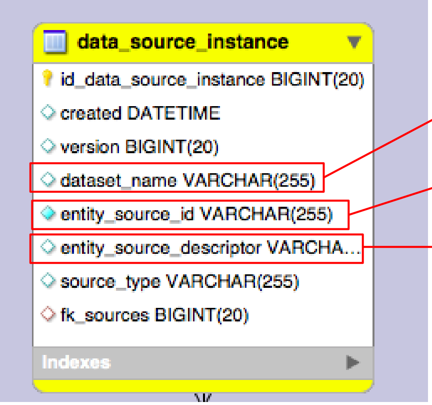
➔Necessary at import time in order to make sense of relational data

➔Helpful later to recover details that are not explicitly represented in DiscourseDB



DiscourseDB Contribution X came from data source Y identified by id Z

<edx_test_forum.json>



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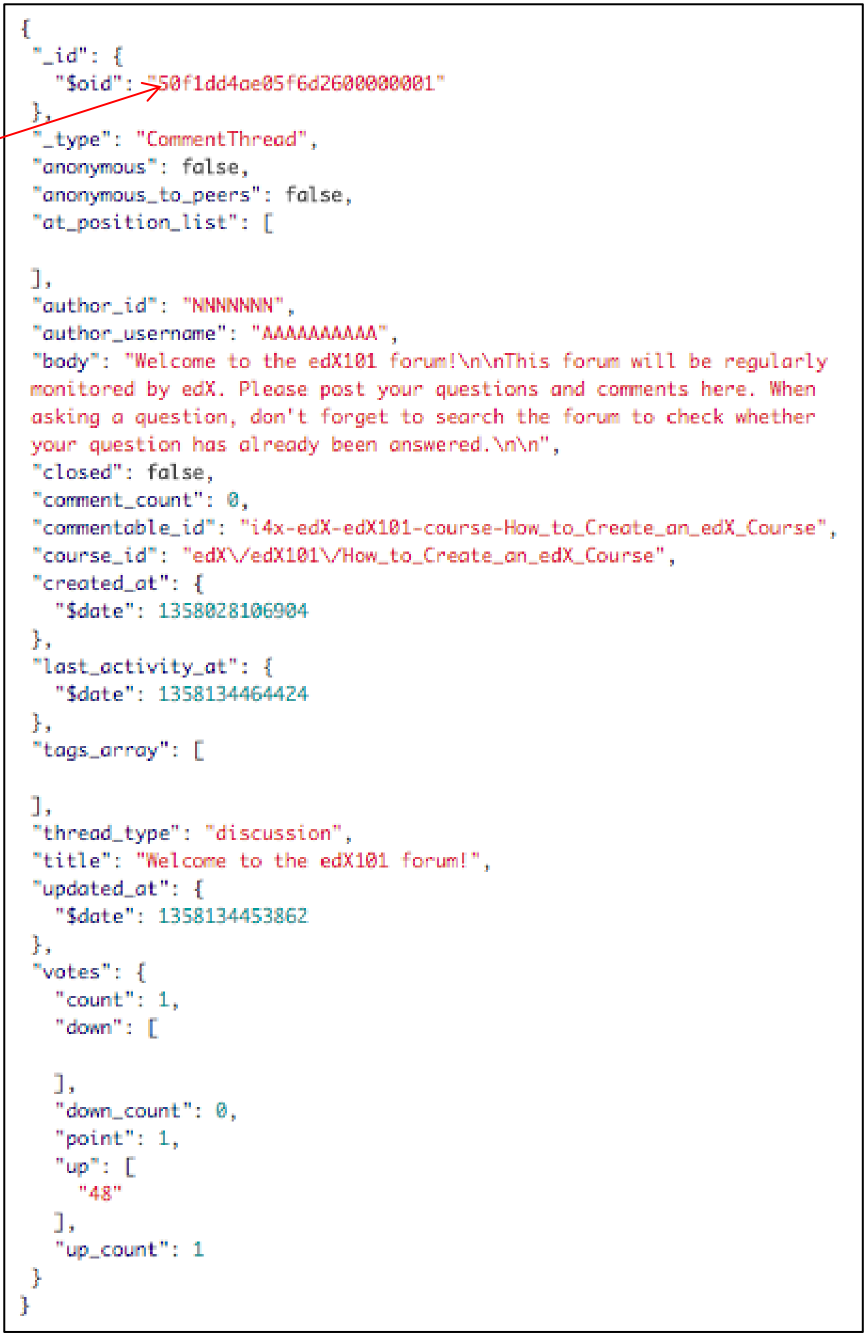

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your question has already been answered.\n\n",
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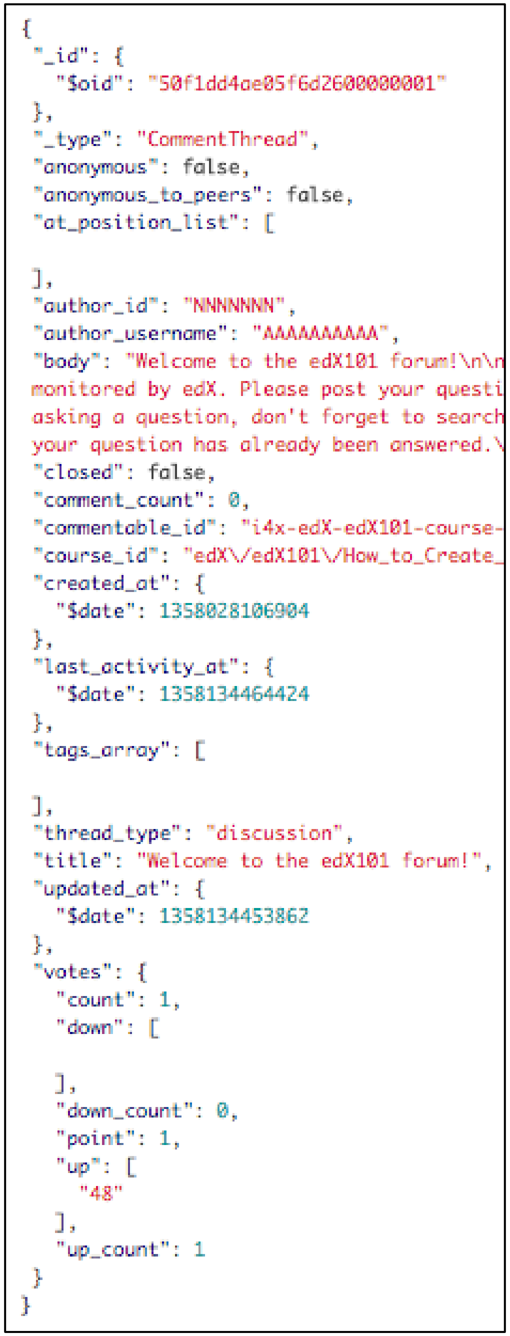
Questions?

Use Case: EdX Forum

- A course has a single forum
- A **CommentThread** represents the first level of interaction: a post that opens a new thread, often a student question of some sort.
- A **Comment** represents both the second and third levels of interaction: a response made directly to the conversation started by a CommentThread is a Comment. Any further contributions made to a specific response are also in Comment objects.

https://edx.readthedocs.org/en/latest/internal_data_formats/discussion_data.html

comment thread



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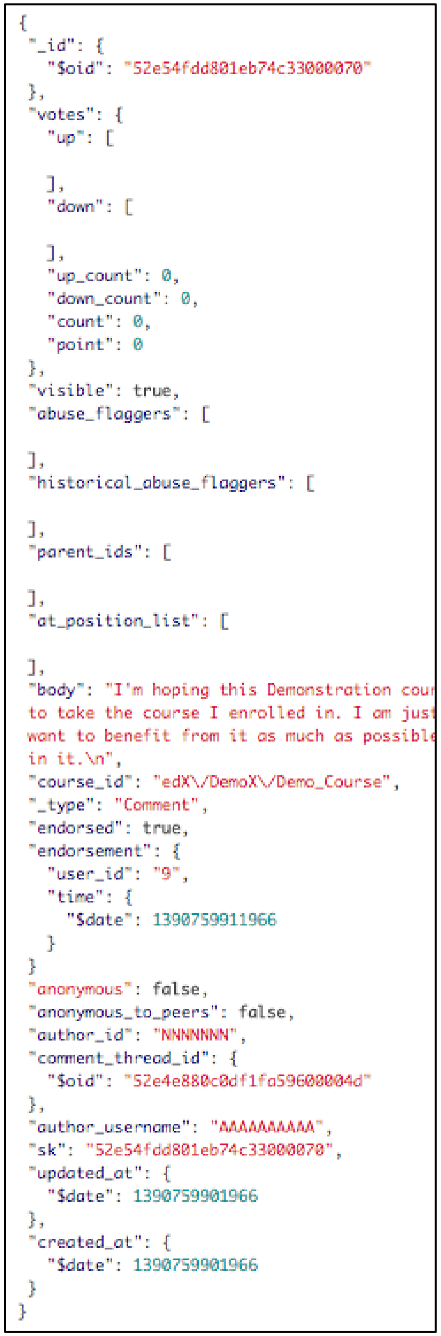
comment



```
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 "_id": {
   "$oid": "52e54fdd801eb74c33000070"
 },
 "votes": {
   "up": [

   ],
   "down": [

   ],
   "up_count": 0,
   "down_count": 0,
   "count": 0,
   "point": 0
 },
 "visible": true,
 "abuse_flaggers": [

 ],
 "historical_abuse_flaggers": [

 ],
 "parent_ids": [

 ],
 "at_position_list": [

 ],
 "body": "I'm hoping this Demonstration cour
 to take the course I enrolled in. I am just
 want to benefit from it as much as possible
 in it.\n",
 "course_id": "edX\/DemoX\/Demo_Course",
 "_type": "Comment",
 "endorsed": true,
 "endorsement": {
   "user_id": "9",
   "time": {
     "$date": 1390759911966
   }
 }
 "anonymous": false,
 "anonymous_to_peers": false,
 "author_id": "NNNNNNN",
 "comment_thread_id": {
   "$oid": "52e4e880c0df1fa59600004d"
 },
 "author_username": "AAAAAAAAAA",
 "sk": "52e54fdd801eb74c33000070",
 "updated_at": {
   "$date": 1390759901966
 },
 "created_at": {
   "$date": 1390759901966
 }
}
```

Use Case: EdX Forum

- A course has a single forum
- A **Com**
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  interac
  a new t
  questic
- A **Com**
  the sec
  interac
  directly
  started
  is a Co
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  specifi
  Comm

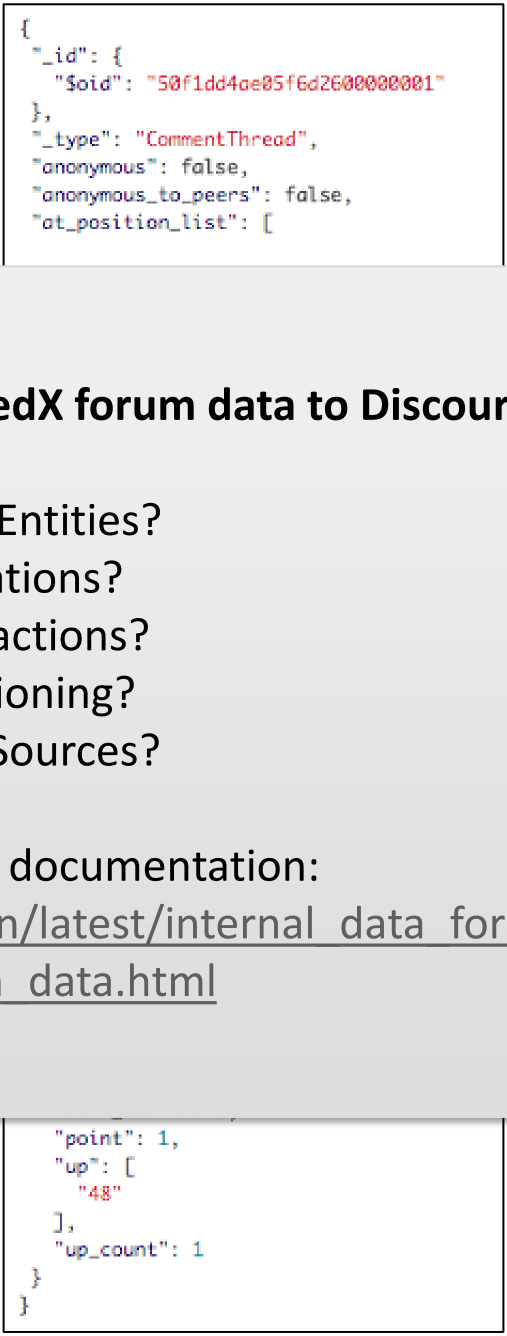
How would we translate the edX forum data to DiscourseDB?

Main Entities?
Relations?
Interactions?
Versioning?
Data Sources?

Forum format documentation:
https://edx.readthedocs.org/en/latest/internal_data_formats/discussion_data.html

https://edx.readthedocs.org/en/latest/internal_data_formats/discussion_data.html

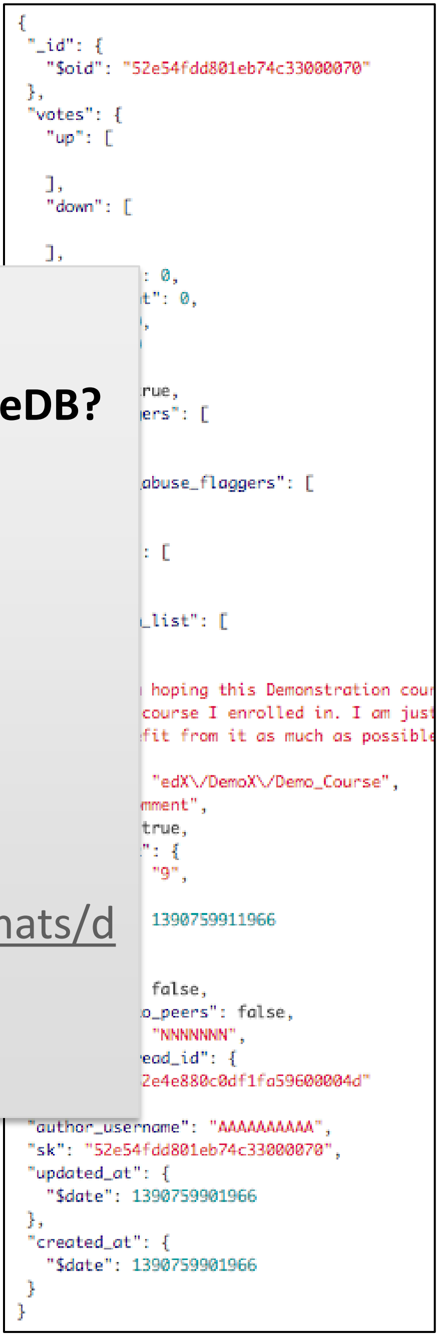
comment thread



```
{
 "_id": {
   "$oid": "50f1dd4ae05f6d2600000001"
 },
 "_type": "CommentThread",
 "anonymous": false,
 "anonymous_to_peers": false,
 "at_position_list": [

   "point": 1,
   "up": [
     "48"
   ],
   "up_count": 1
  }
}
```

comment



```
{
 "_id": {
   "$oid": "52e54fdd801eb74c33000070"
 },
 "votes": {
   "up": [

   ],
   "down": [

   ],
              : 0,
              t": 0,
              ,

              rue,
              ers": [

              abuse_flaggers": [

              : [

              _list": [

              hoping this Demonstration cour
              course I enrolled in. I am just
              fit from it as much as possible
               "edX\/DemoX\/Demo_Course",
              mment",
              true,
              ": {
               "9",

               1390759911966

               false,
              o_peers": false,
               "NNNNNNN",
              ead_id": {
              2e4e880c0df1fa59600004d"

 "author_username": "AAAAAAAAAA",
 "sk": "52e54fdd801eb74c33000070",
 "updated_at": {
   "$date": 1390759901966
 },
 "created_at": {
   "$date": 1390759901966
 }
}
```