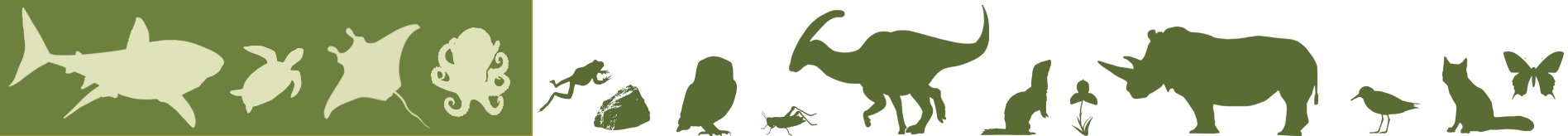
Specify

Collections Consortium

Table Relationship Dependence





Working with Table Dependence

Thursday, 24 Sept 2026

3 pm CDT

Specify
Collections Consortium

Learning Outcomes

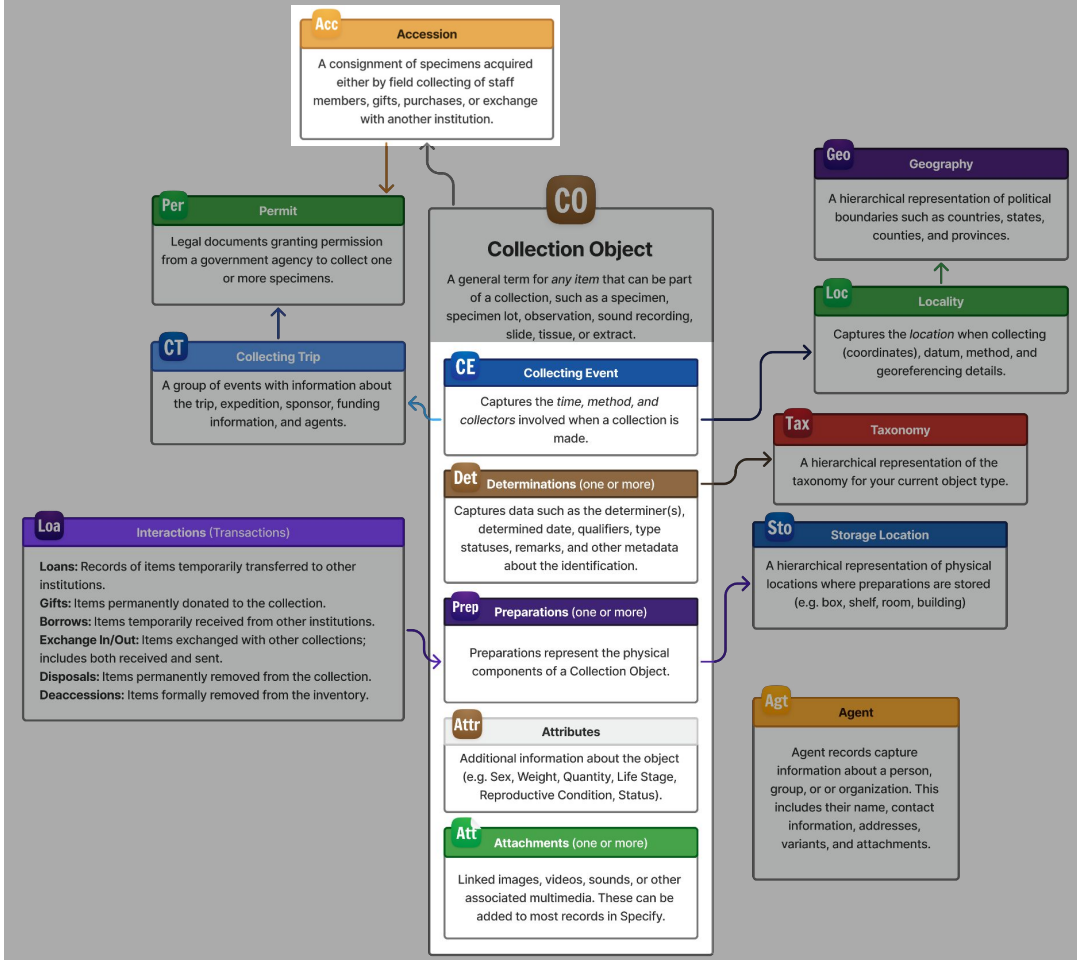
- ❏ Understand table relationships and their significance
- ❏ Know how to identify if a table is independent or dependent
- ❏ Upload related records in the WorkBench with confidence
- ❏ Know when and how to bulk delete records using Batch Edit

The Specify data model is comprised of a complex network of table relationships.

- Each table has its own set of fields and relationships.
- The number of relationships can range from three to 37.

Collection Object has 37 relationships!

(Six of which are shown to the right) →



What is a Table Relationship?

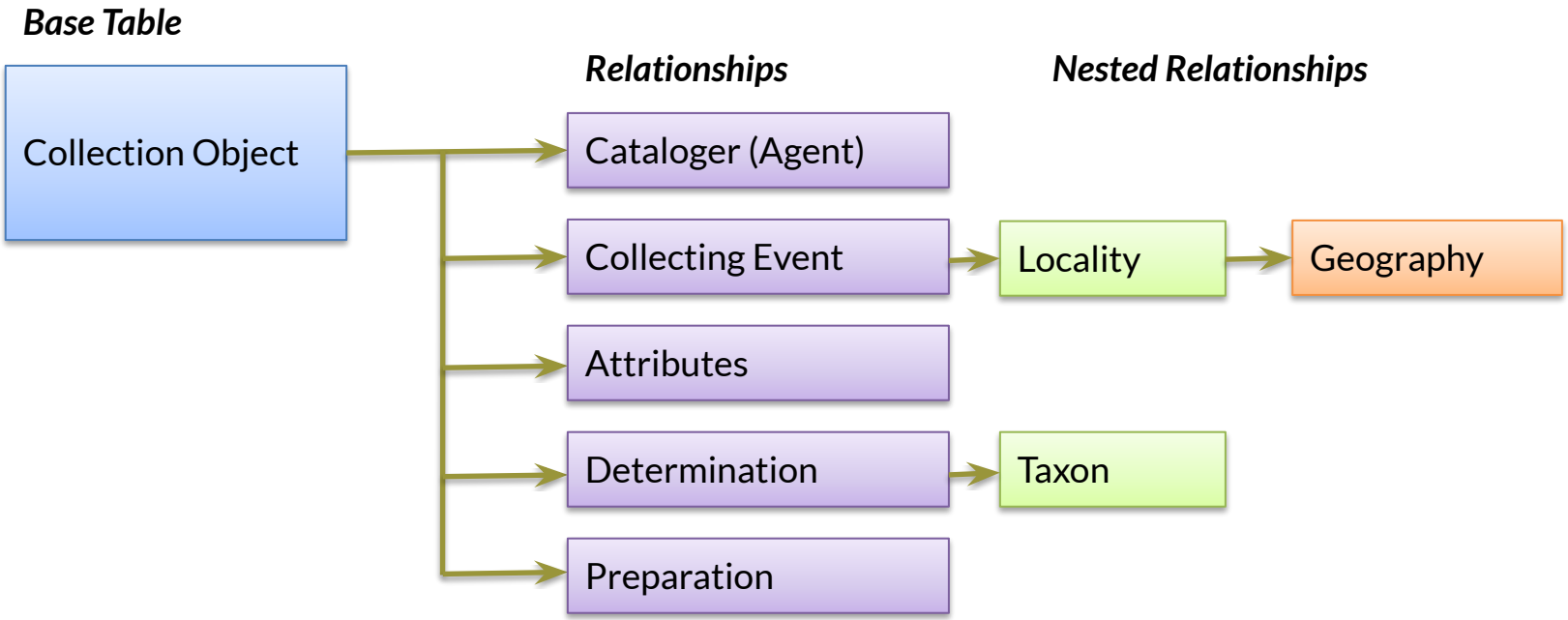
A Table Relationship describes the connection between <u>two</u> tables.

Each table relationship has two distinguishing attributes:

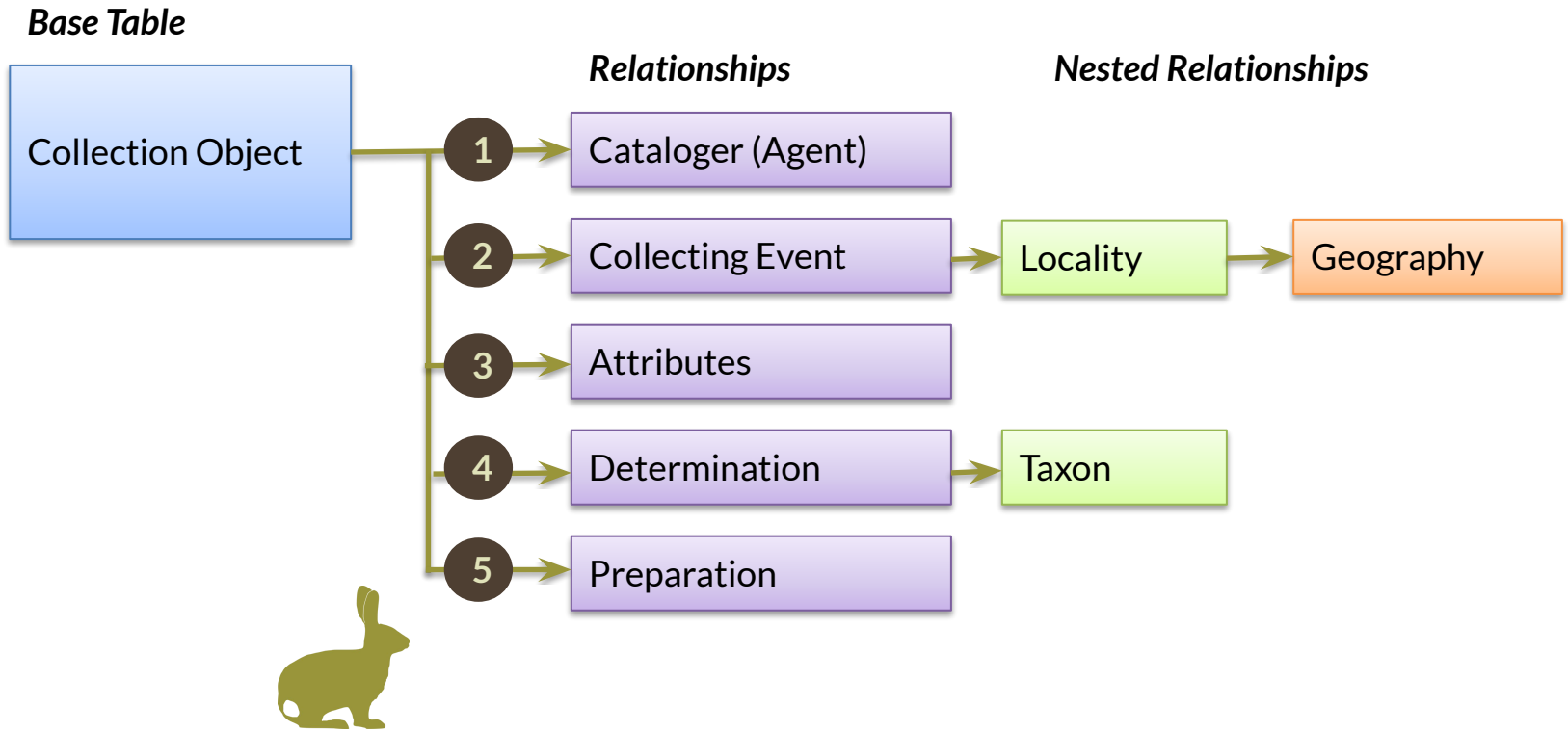
1. **Cardinality/Type** (i.e., to-many or to-one)
2. **Dependence** (i.e., dependent or independent)

There are over 1000 relationship pairs in the Specify data model!

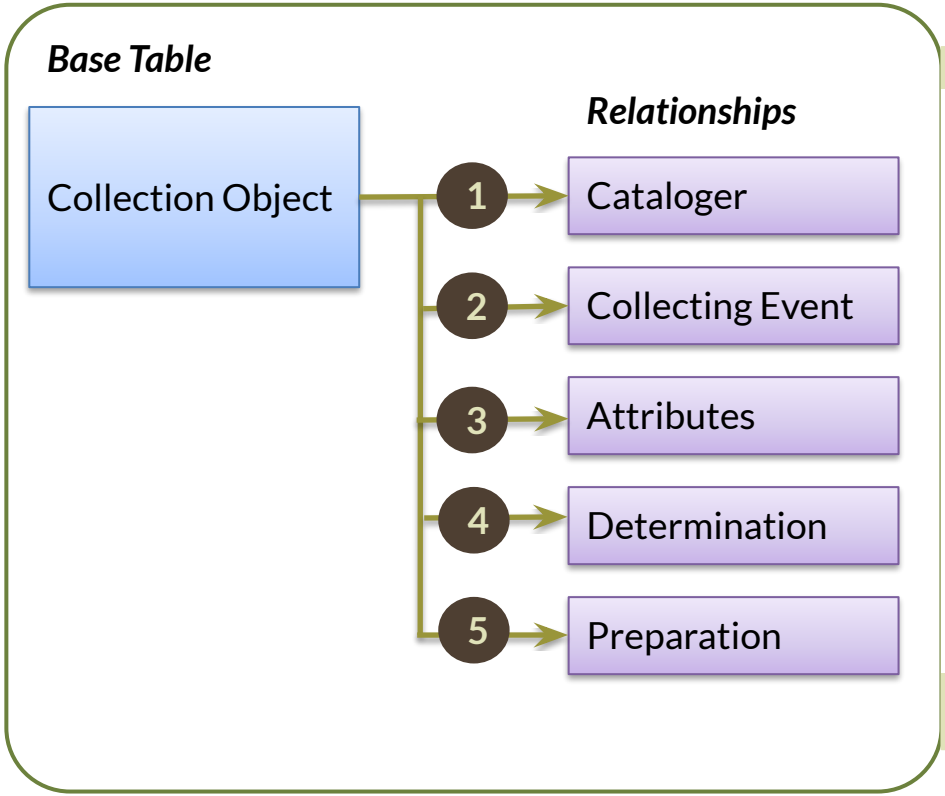
What is a Table Relationship?



What is a Table Relationship?



What is a Table Relationship?



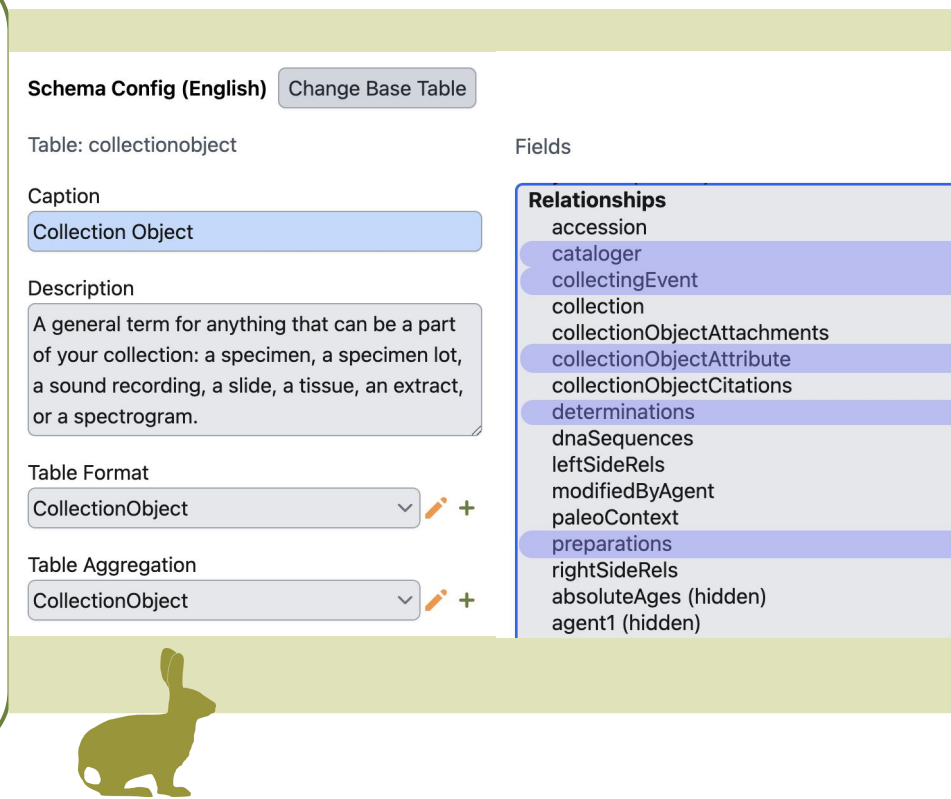


Table Relationship

Cardinality

Determines how records from one table can be linked to another.

“Can I add one record here or multiple records?”

one-to-one | many-to-one | one-to-many

Dependence

Concerned with whether or not a ‘child’ record can exist without its ‘parent’ record.

“Would that record exist if this one didn’t anymore?”

Independent | Dependent

What is a Table Relationship?

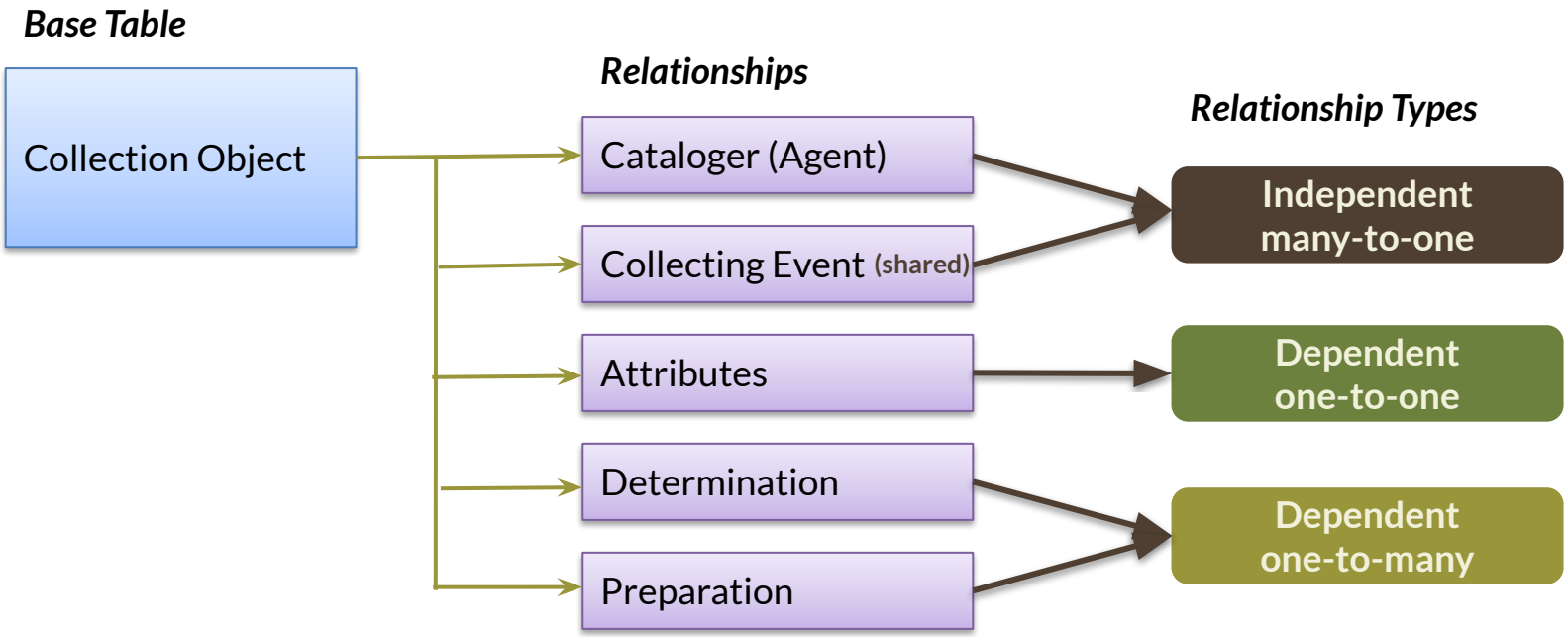
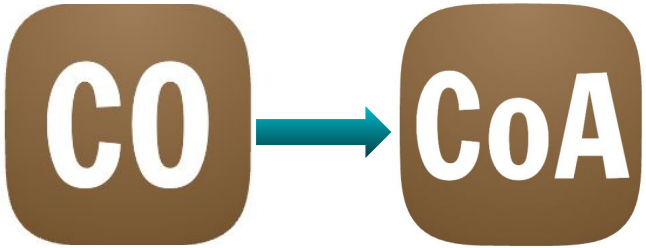


Table Relationship Cardinality

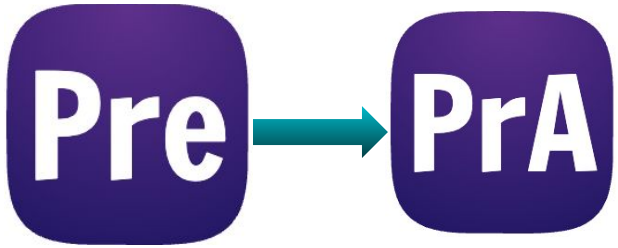


One-to-one

A record is linked to exactly one other record



Collection Object → Collection Object Attribute

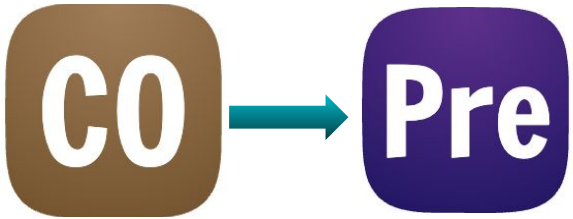


Preparation → Preparation Attribute

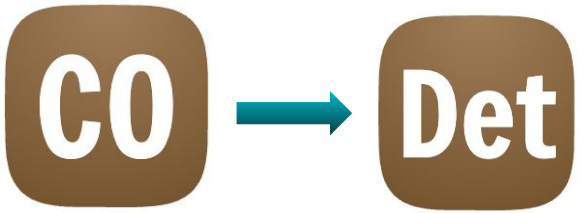
More information: Specify Terminology

One-to-many

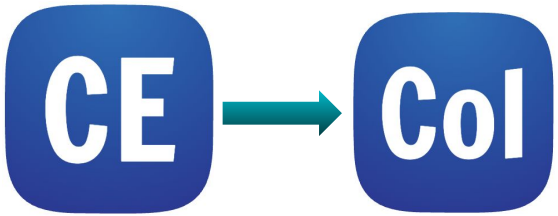
A record relates to multiple others



Collection Object → Preparation



Collection Object → Determination

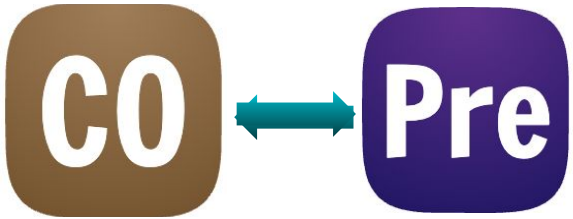


Collecting Event → Collectors

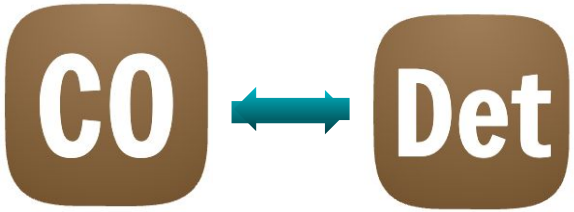
More information: Specify Terminology

One-to-many

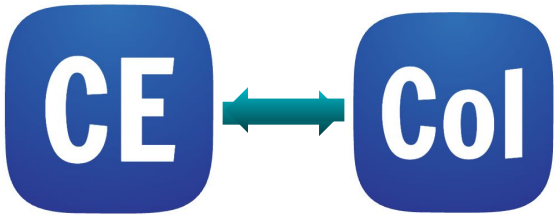
A record relates to multiple others



Collection Object → Preparation



Collection Object → Determination

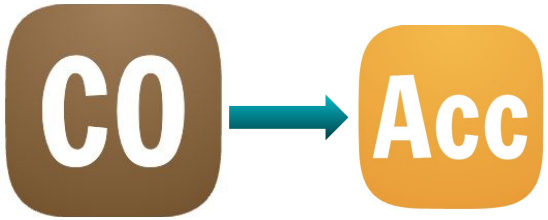


Collecting Event → Collectors

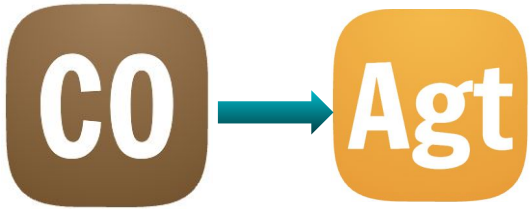
More information: Specify Terminology

Many-to-one

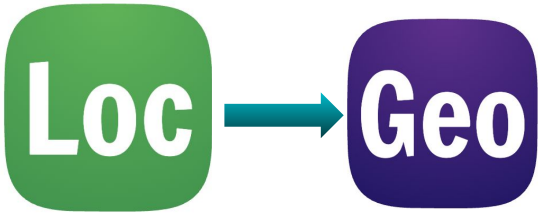
Multiple records point to a single record



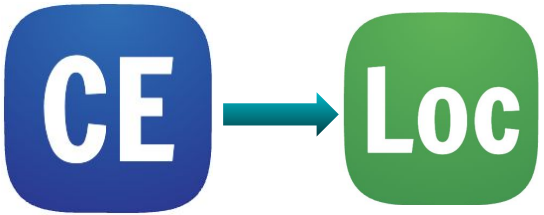
Collection Object → Accession



Collection Object → Agent (Cataloger)



Locality → Geography



Collecting Event → Locality

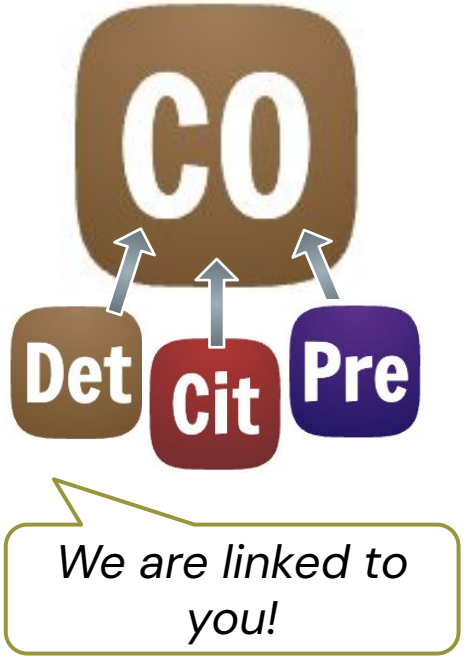
More information: Specify Terminology

Table Relationship Dependence



Dependent Relationships

A **dependent** relationship means that the existence of a record in the “child” table depends on the existence of a record in the “parent” table.



More information: Dependent vs Independent Relationships

Independent Relationships

An **independent** relationship means that the related record can exist on its own, regardless of whether it is referenced by another record.

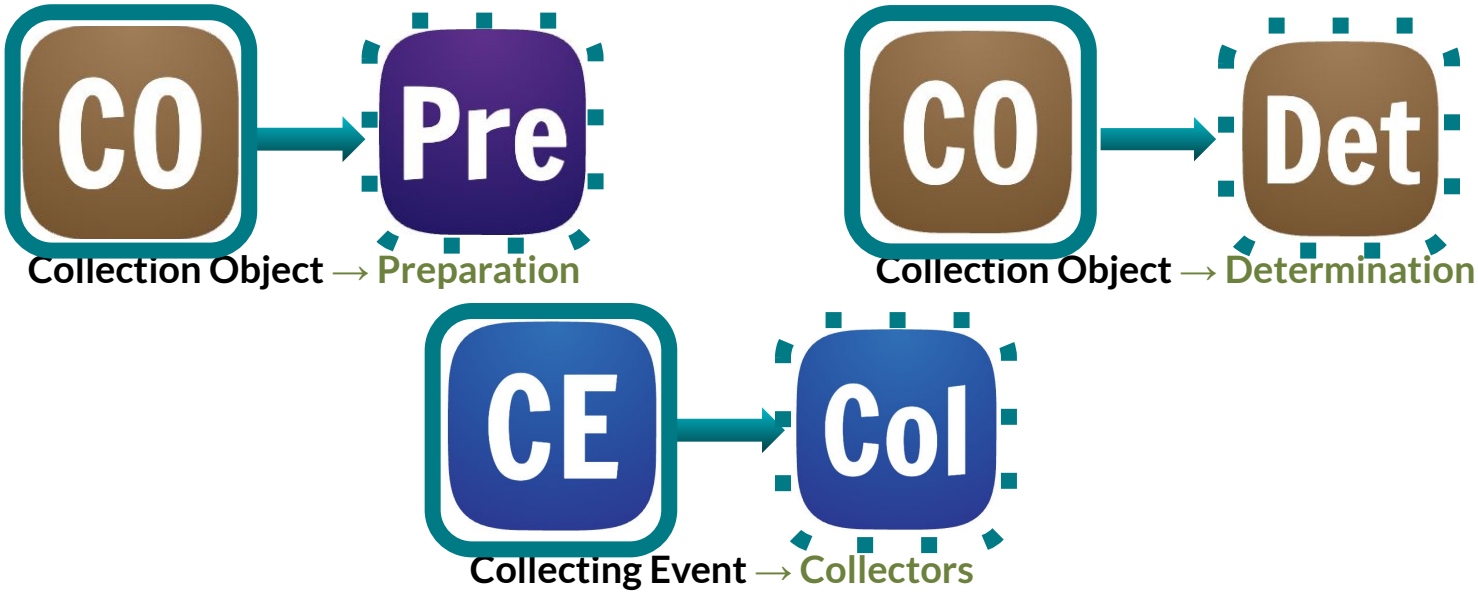
- Independent records **can only be deleted via the forms.**



More information: Dependent vs Independent Relationships

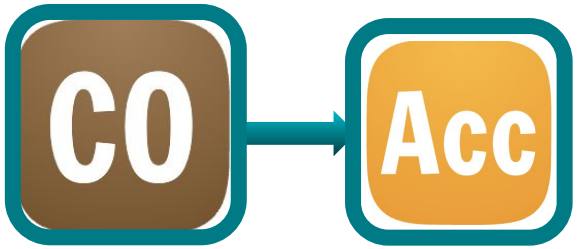
Independent or Dependent?

One-to-many: A record relates to multiple others



Independent or Dependent?

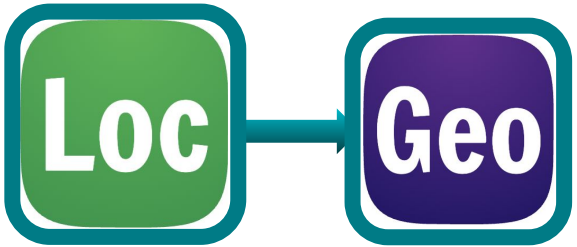
Many-to-one: A record relates to multiple others



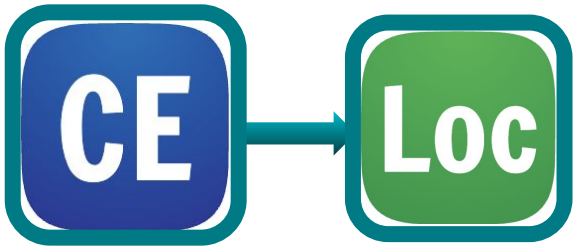
Collection Object → Accession



Collection Object → Agent (Cataloger)



Locality → Geography



Collecting Event → Locality

Exploring Table Relationships
View and Interpret

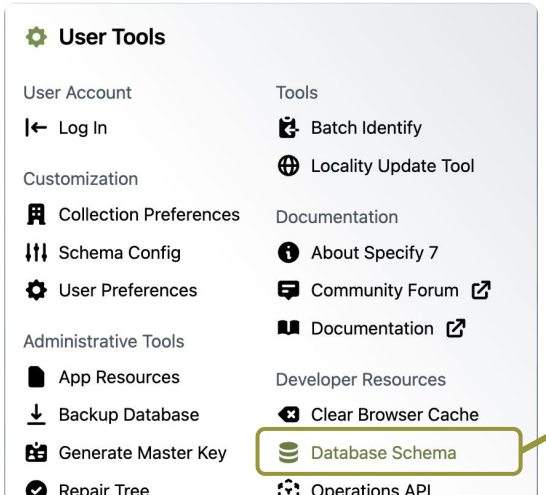


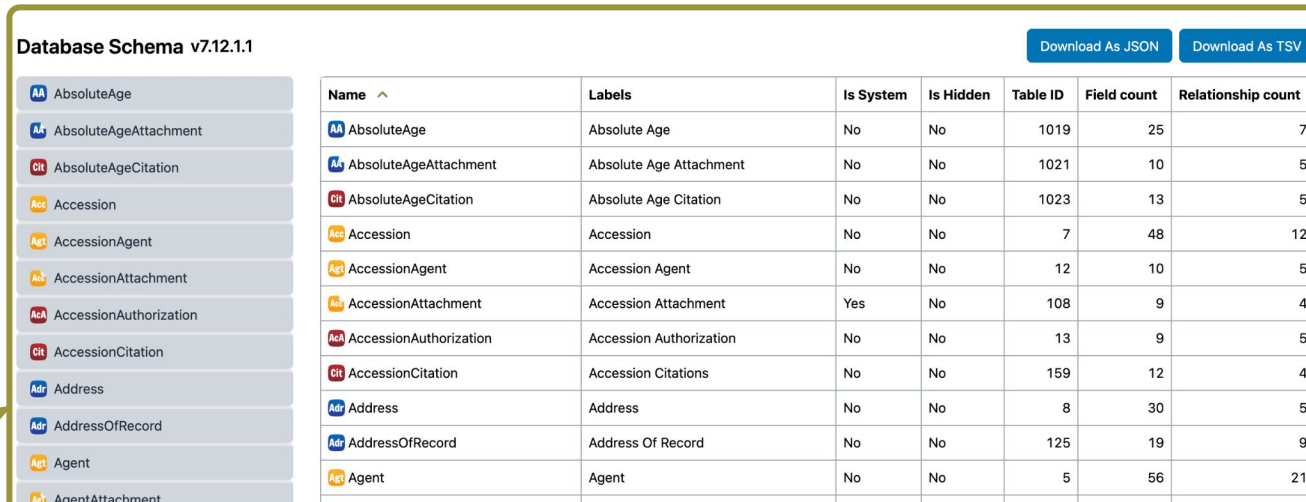
View Database Schema

Within your Specify 7 installation, you can explore the data model for your current schema configuration by navigating to:

`https://YOUR-SPECIFY-INSTANCE/specify/data-model/`

Or, select **Database Schema** from User Tools.





Viewing Relationships in Database Schema

Database Schema v7.12.1.1

- CollectingTripAttachment
- CollectingTripAttribute
- CollectingTripAuthorization
- Collection
- CollectionObject
- CollectionObjectAttachment
- CollectionObjectAttr

CollectionObject

Go to top

ID Field: collectionObjectId

Scope: Collection

Fields

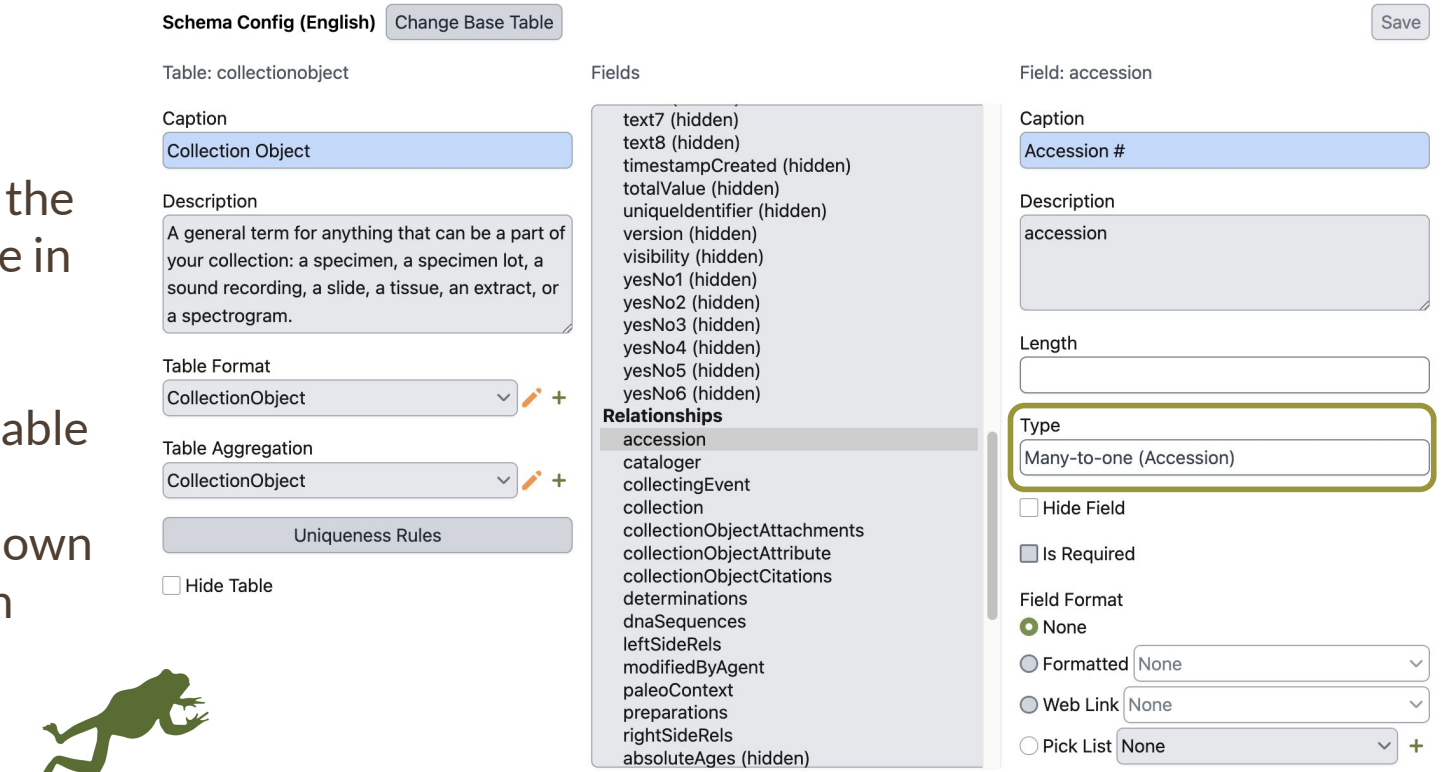
Name	Labels	Description	Is Hidden	Read-only	Is Required	Type	Length	Database Column
actualTotalCountAmt	Actual Total Count Amt		No	Yes	No	Integer		
age	Age		No	Yes	No	String		
altCatalogNumber	Alt Catalog Number	Alternate catalog number	No	No	No	String	64	AltCatalogNumber
availability	Availability	Availability	Yes	No	No	String	32	Availability

Relationships | Dependent | Independent

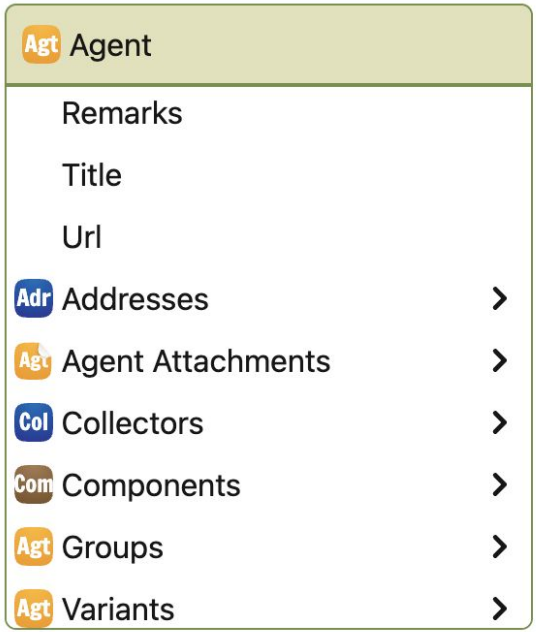
Name	Labels	Description	Is Hidden	Read-only	Is Required	Type	Database Column	Related Model	Other side name	Dependent
absoluteAges	Absolute Ages	One or more absolute ages associated with the specimen.	No	No	No	One-to-many		AbsoluteAge	collectionObject	Yes
accession	Accession Number	Accession contains the usual fields within Specify.	No	No	No	Many-to-one	AccessionID	Accession	collectionObjects	No
agent1	Agent1	Agent1	Yes	No	No	Many-to-one	Agent1ID	Agent		No
appraisal	Appraisal	Appraisal	Yes	No	No	Many-to-one	AppraisalID	Appraisal	collectionObjects	No
cataloger	Cataloger	Agent record for the user cataloging the collection object.	No	No	No	Many-to-one	CatalogerID	Agent		No

Viewing Relationships in Schema Config

- View a list of relationships for the chosen base table in Schema Config.
- Cardinality and table name for each relationship is shown under **Type** when selected.



Viewing Relationships in Query Builder



View all relationships unhidden in Schema Config for the chosen base table.



Click “Reveal Hidden Form Fields” to view/map hidden fields and relationships.

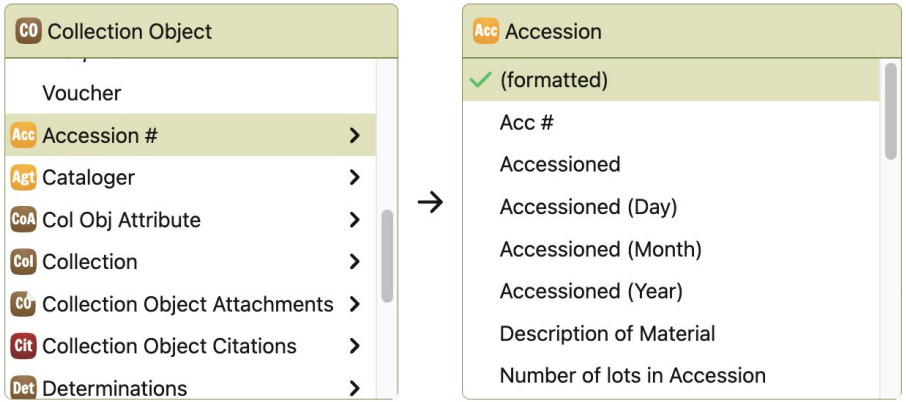
Interpret

Table Relationships in the User Interface



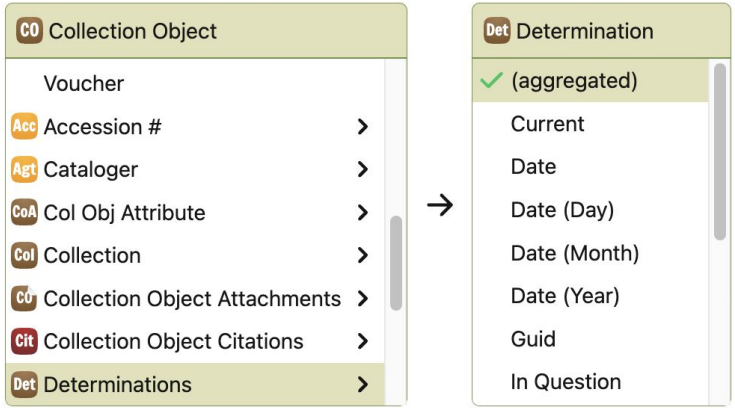
Relationships in Query Builder

Many to One



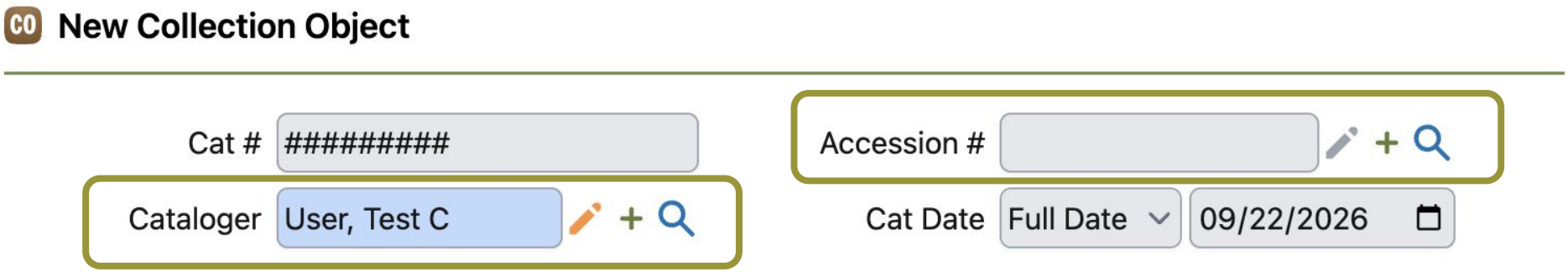
Tables with a **to-one** relationship can be mapped as **(formatted)**

One to Many



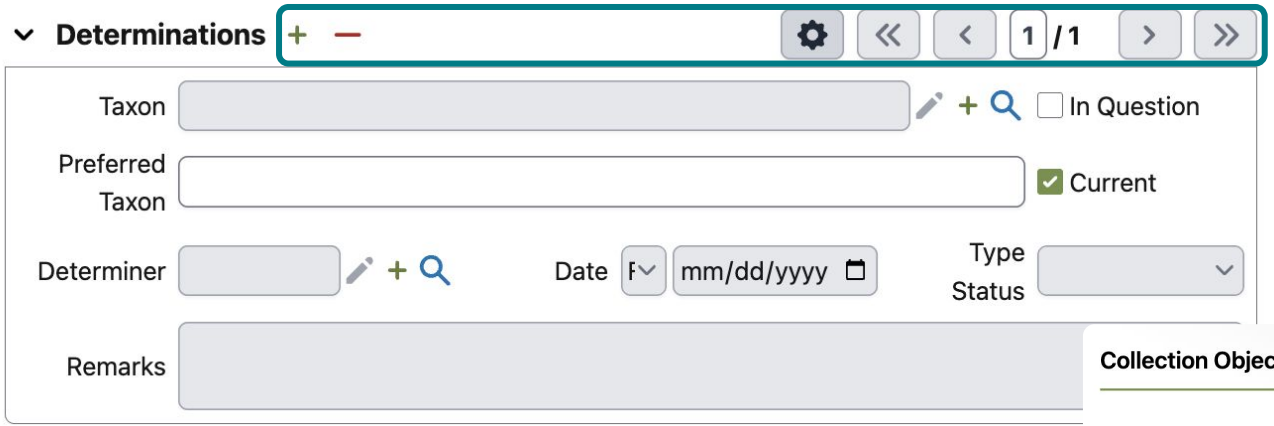
Tables with a **to-many** relationship can be mapped as **(aggregated)**

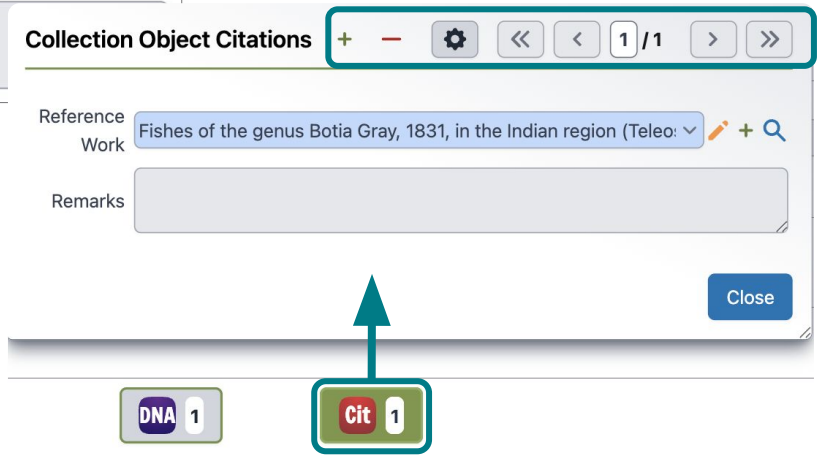
Relationships on Forms



Query combobox fields represent an **independent to-one** relationship.

Relationships on Forms





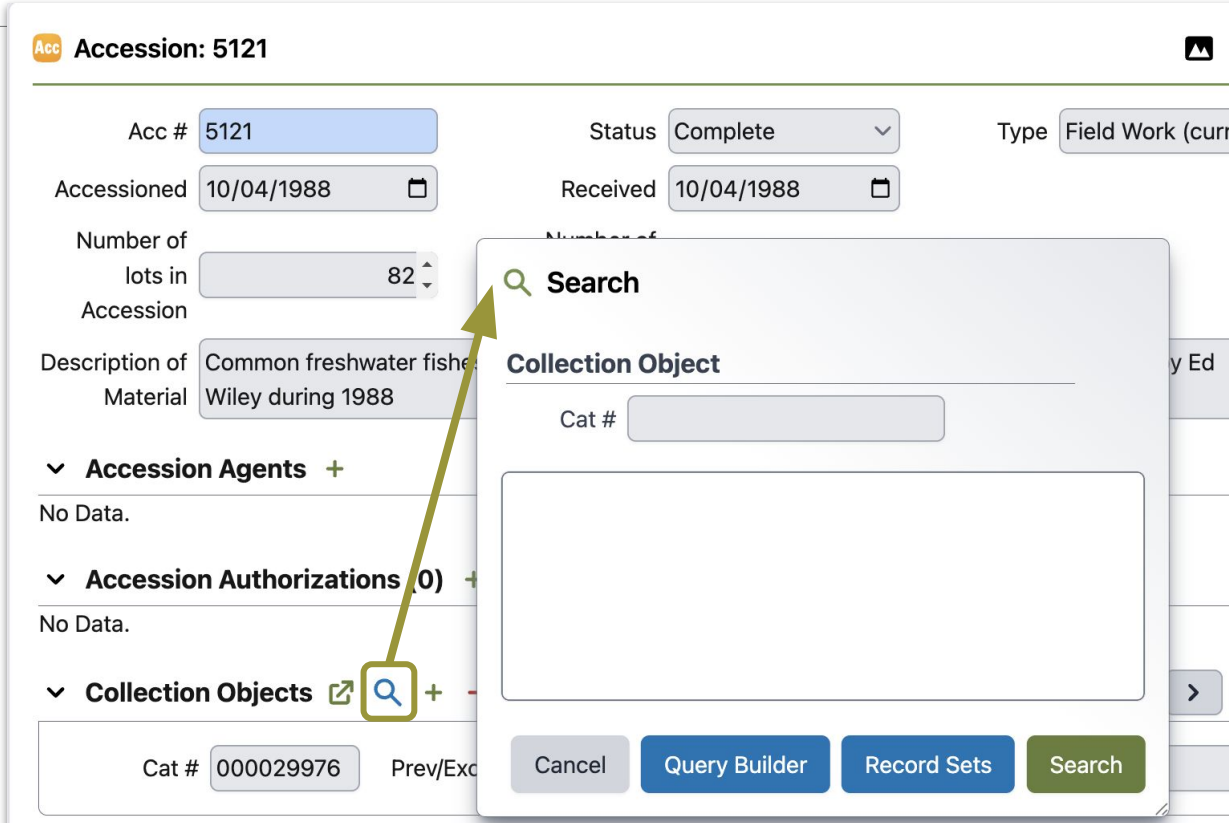
A **subform** with both Add *and* Delete enabled represents a **dependent to-many relationship**.

Relationships on Forms

Independent Subviews are distinguished by the magnifying glass **Search** option.







Interpreting Forms: Related Record Deletion

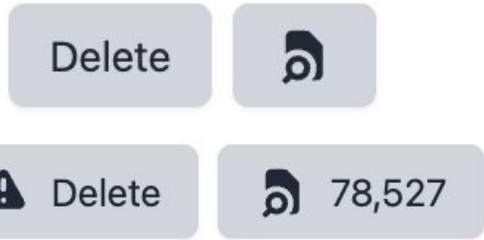
Dependent records are deleted with the minus or trash can icons found in the form/button subviews and grid subviews respectively.

(Form/Button)



(Grid)

Independent records have the “Delete” and related records button in the bottom left of the form.



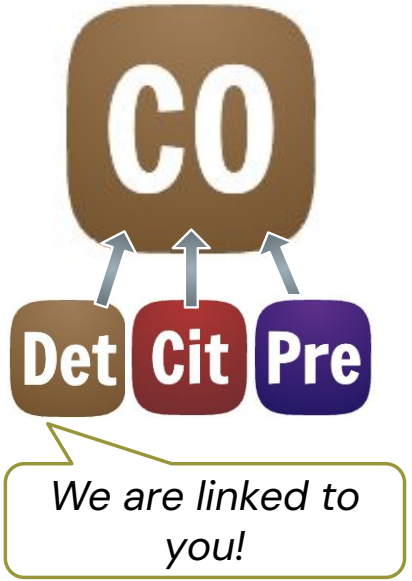
(Delete Blocked)

Bulk Actions for Related Records



Bulk Actions: *Dependent* Relationships

- In WorkBench, you can **upload new dependent records** and link them to existing records in the database.
  - E.g., adding new Preparations.
- In Batch Edit, you can **delete dependent records** in bulk.
  - E.g., deleting Determiner records.

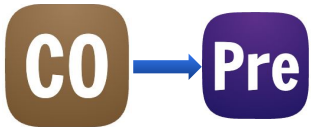


More information: Dependent vs Independent Relationships

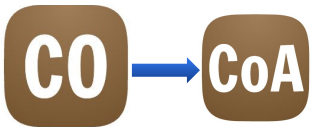
Batch Edit Expected Behavior

Dependent Relationships

Update	Create	Delete
Changes in mapped fields directly update the related records	If a related record does not exist and you enter data, it is created	If all mapped fields are cleared, Batch Edit will attempt to delete the related record only if: 1. All fields in the database for that record are empty (excluding system fields), as per the preference. 2. The record has no further dependents.



Collection Object → Preparation



Collection Object → Collection Object Attribute

More information: Expected Behavior in Batch Edit

Bulk Actions: *Independent* Relationships

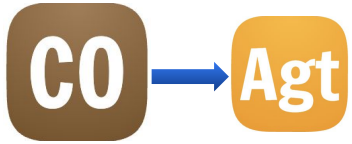
- Independently-related records **can be created or matched to** using the WorkBench.
  - *E.g.*, creating new and match to existing localities for new CEs in WorkBench.
- In Batch Edit, you can **update the links to independent records**.
  - *E.g.*, changing or adding a Locality to existing Collecting Events.
- No bulk deletion.



More information: Dependent vs Independent Relationships

Batch Edit Expected Behavior

Many-to-one Independent Relationship



Collection Object → Agent (Cataloger)

Match	Clone	Unlink
If you enter values that match an existing record (according to matching preferences), the relationship is updated to link to the matched record.	If no match is found, a new record is created by cloning the existing related record and applying your changes. Any mapped dependents are also cloned; unmapped dependents remain unchanged.	Clearing all mapped fields removes the relationship from the base record, but does not delete the related record. The original related record remains in the system.

More information: Expected Behavior in Batch Edit

Batch Edit Expected Behavior

One-to-many Independent Relationship

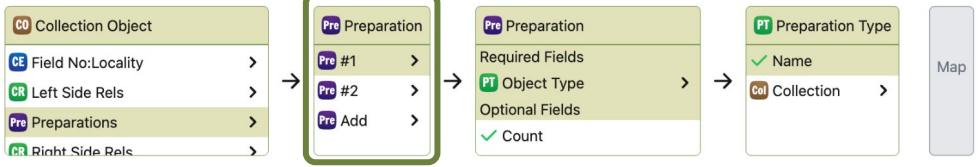


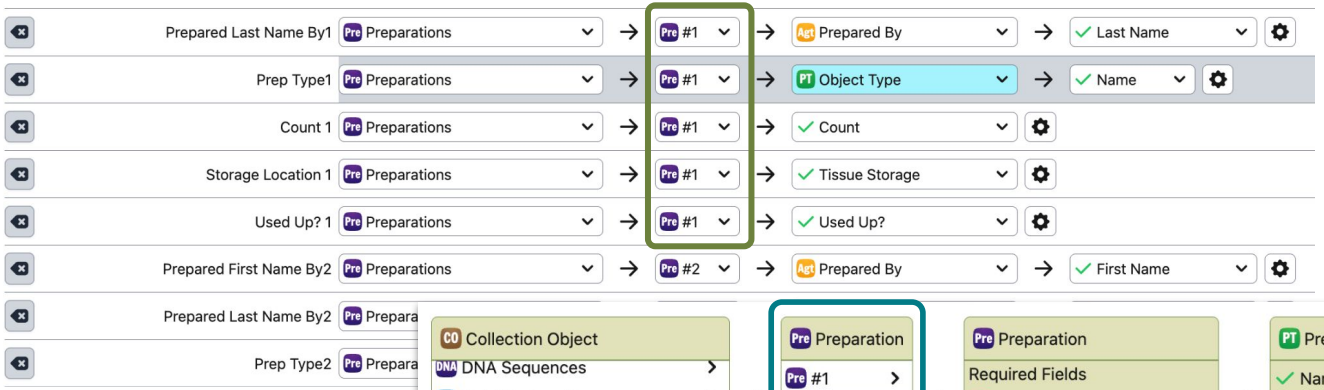
Update	Create	No Deletion or Unlinking
Changes are applied to the related records.	If a related record does not exist and you enter data, it is created.	Clearing all fields does not delete the related record nor unlink the relationship.

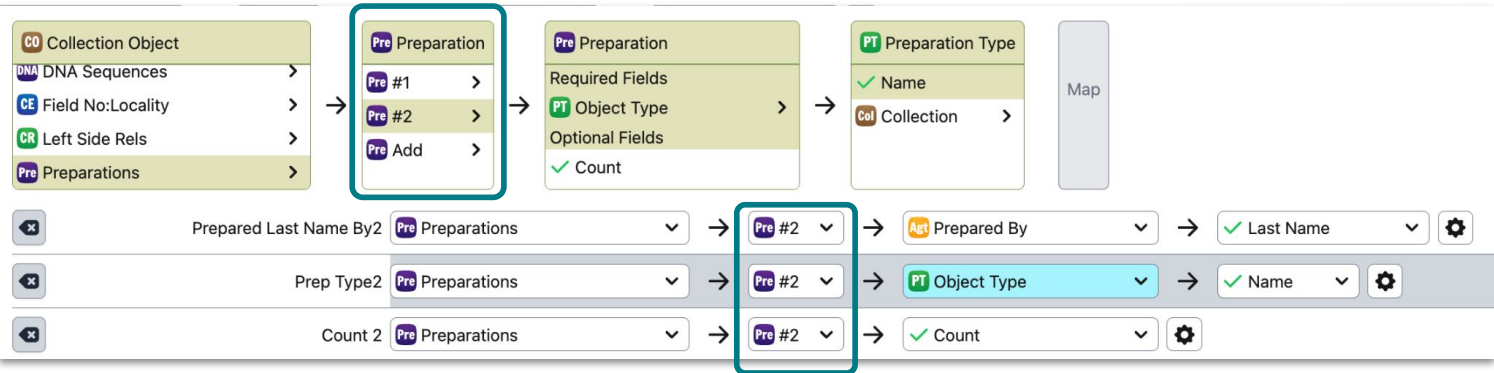
More information: Expected Behavior in Batch Edit

To-many Relationships in WorkBench

To-many tables map through a **serial picker** in the WorkBench data mapper.







To-many Relationships in WorkBench

Uploading one-to-many records requires **a set of columns for each to-many record** being uploaded to the base table record.

As such, **column headers will be repeated and serialized.**

E.g., **prepType_1** and **prepType_2** for a CO with two preparations.

Prep #1

	Prepared Last Name By1	Prep Type1	Count 1	Storage Location 1	Used Up? 1
2		Image	0		false
3		Tissue	100		false
4		Tissue	100		false
5		Image	0		false
6		Image	0		false
7		Tissue	100	CAS 222394	false
8		Tissue	100	Whole sp. - No vouc	false
9		Tissue	100	Whole sp. - No vouc	false
10		Tissue	100	Whole sp. - No vouc	false

Prep #2

Prepared First Name By2	Prepared Last Name By2	Prep Type2	Count 2	Storage Location 2	Used Up
		Tissue	100		false
		Image	0		false
		Image	0		false
		Tissue	100		false
		Tissue	100		false
		Image	0	CAS 222394	false

Summary of Bulk Actions for Relationships

WorkBench Abilities	WorkBench Limitations	Batch Edit Abilities	Batch Edit Limitations
Upload new dependent records to existing independent ones. Upload new *and* match to existing independent records.	No uploading to-many independent records. Cannot update links to related records.	Batch delete or unlink dependent records. Unlink independent records.	No deleting independent records. Cannot delete *and* unlinking dependent records in one dataset.

Bulk Actions and Related Records

Example Scenarios



“Blank” Determinations

Action:

Upload Determinations with yes/true or no/false in each row of the **Current?** column(s) regardless of if there’s more data for that Determination record in other columns or not.

Det Current 1	CO Field #	Agt Ideintified by last	Agt Identified by first	Agt Identified by middle	Det Identified Date	Det Current 2
Yes	TUU 50-68	Smith	William	L	12/18/2019	No
Yes	TUU 50-68	Smith	William	L	12/18/2019	No
Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
Yes	TUU 54-44	Martin	Rene	P	12/18/2019	Yes
Yes	TUU 50-69	Smith	William	L	12/18/2019	No
Yes	TUU 54-49	Martin	Rene	P	12/18/2019	No

“Blank” Determinations

Outcome:

A new determination will be created for each row. Since the only input is that **Current?** is false/no, the determinations will appear blank on the forms.

CO Collection Object	Tax Taxon - Full Name	Det Determinations - Current
000043574	Etheostoma spectabile	Yes
000043574		No



“Blank” Determinations

Resolution: Delete “Blank” Determinations in Batch Edit.

1. Create a record set of the uploaded records.
2. Query within that record set.
3. Map fields: **Current?** and **Taxon (any rank) Full Name**.
4. Save, run the query, then click Batch Edit.
5. In the dataset that opens, clear the **Is Current?** column.
6. Validate, check cell highlights and results, then Commit changes.



Best Practice:

Only add False/No to cells in the **Is Current?** column when associated with a non-current determination record.

Determiner vs Determiners Mix-Up

Action:

Upload to Determiners (to-many), but your forms and records use the to-one Determiner relationship.

	Det Current 1	CO Field #	Agt Ideintified by last	Agt Identified by first	Agt Identified by middle	Det Identified Date	Det Cu
1	Yes	TUU 50-68	Smith	William	L	12/18/2019	No
2	Yes	TUU 50-68	Smith	William	L	12/18/2019	No
3	Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
4	Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
5	Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
6	Yes	TUU 54-44	Martin	Rene	P	12/18/2019	No
7	Yes	TUU 54-44	Martin	Rene	P	12/18/2019	Yes
8	Yes	TUU 50-69	Smith	William	L	12/18/2019	No
9	Yes	TUU 54-49	Martin	Rene	P	12/18/2019	No
10	Yes	TUU 54-49	Martin	Rene	P	12/18/2019	No
11	Yes	TUU 54-49	Martin	Rene	P	12/18/2019	No
12	Yes	TUU 54-49	Martin	Rene	P	1/28/2020	No

Records affected

Number of new records affected in each table:

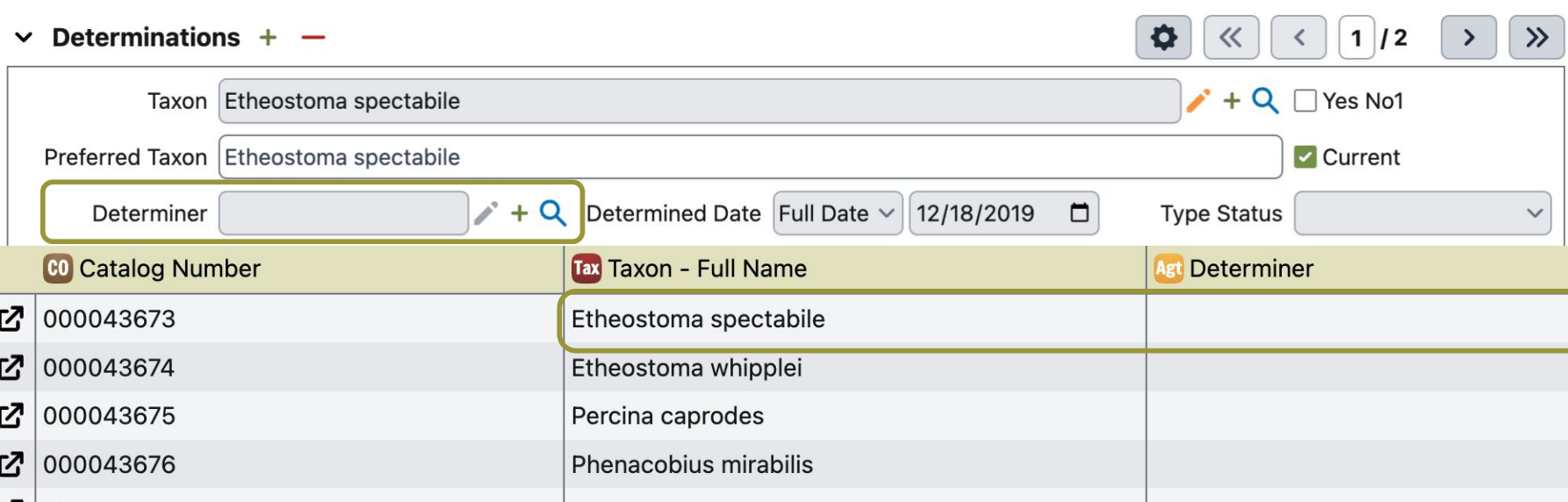
New records

- CO Collection Object: 99
- CoA Collection Object Attribute: 99
- Det Determiner: 99
- Pre Preparation: 99
- Det Determination: 198

Determiner vs Determiners Mix-Up

Outcome:

The recently uploaded Determination records appear without a determiner on the forms.



Determiner vs Determiners Mix-Up



Resolution: Transfer Agent data between tables using Batch Edit.

1. Create a query on the Determination table.
2. Map fields: **CO Catalog Number**, **Determiners First and Last Name**, and **Determiner First and Last Name**.
3. Save, run query, then click Batch Edit.
4. In the data editor, transfer values from Determiners columns to the Determiner columns.
5. Validate, Disambiguate where needed, then Commit.

Best Practice: Ensure that Schema Config is accurate and up to date to avoid accidentally choosing the wrong field or table in the field mapper.

Accidental Agent Duplication

Action:

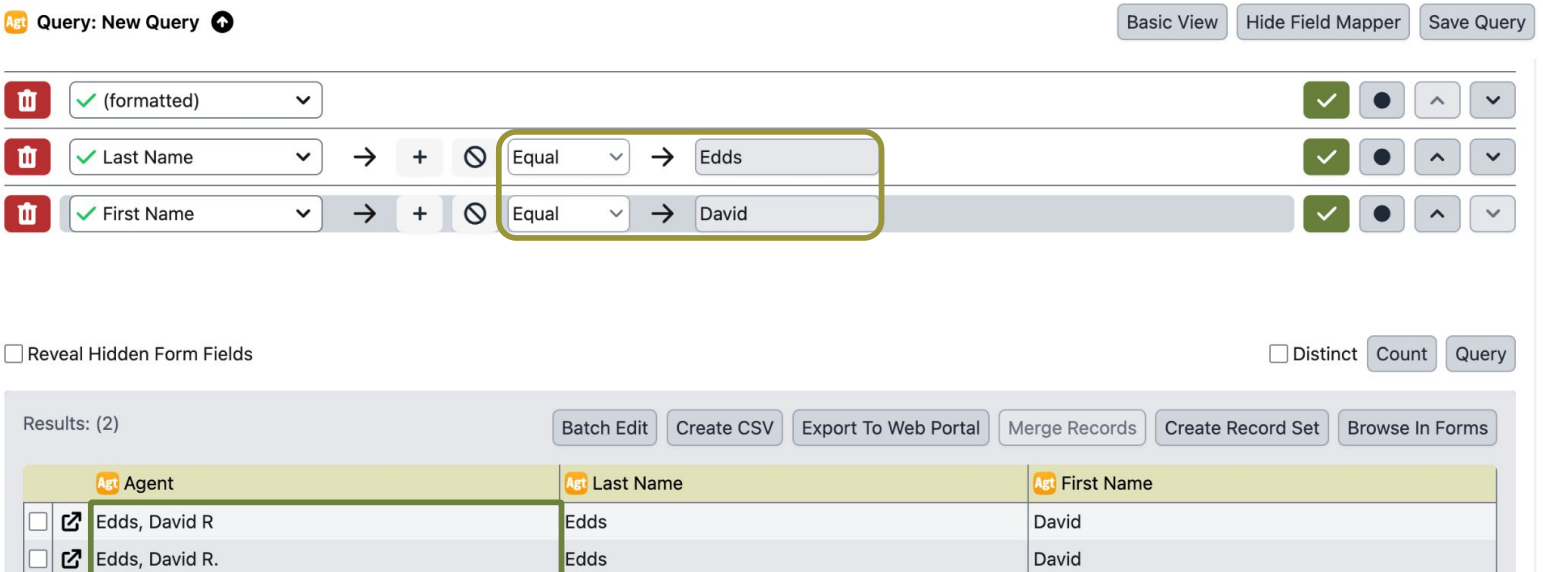
Include data that conflicts with the existing Agent record(s) in the upload. Conflicting data might be a typo in the Last Name column, a period after the middle initial, or a missing abbreviation.

	Det Current 1	CO Field #	Agt Ideintified by last	Agt Identified by first	Agt Identified by middle	Det Identified Date
25	Yes	TUU 65-20	Edds	David	R	1/28/2020
26	Yes	TUU 71-09	Edds	David	R	1/28/2020
27	Yes	TUU 71-09	Edds	David	R	1/28/2020
28	Yes	TUU 71-09	Edds	David		1/28/2020
29	Yes	TUU 71-09	Edds	David	R.	1/28/2020
30	Yes	TUU 71-09	Edds	David		1/28/2020
31	Yes	TUU 71-09	Edds	David	R	1/28/2020
32	Yes	TUU 71-09	Edds	David	R	1/28/2020

Accidental Agent Duplication

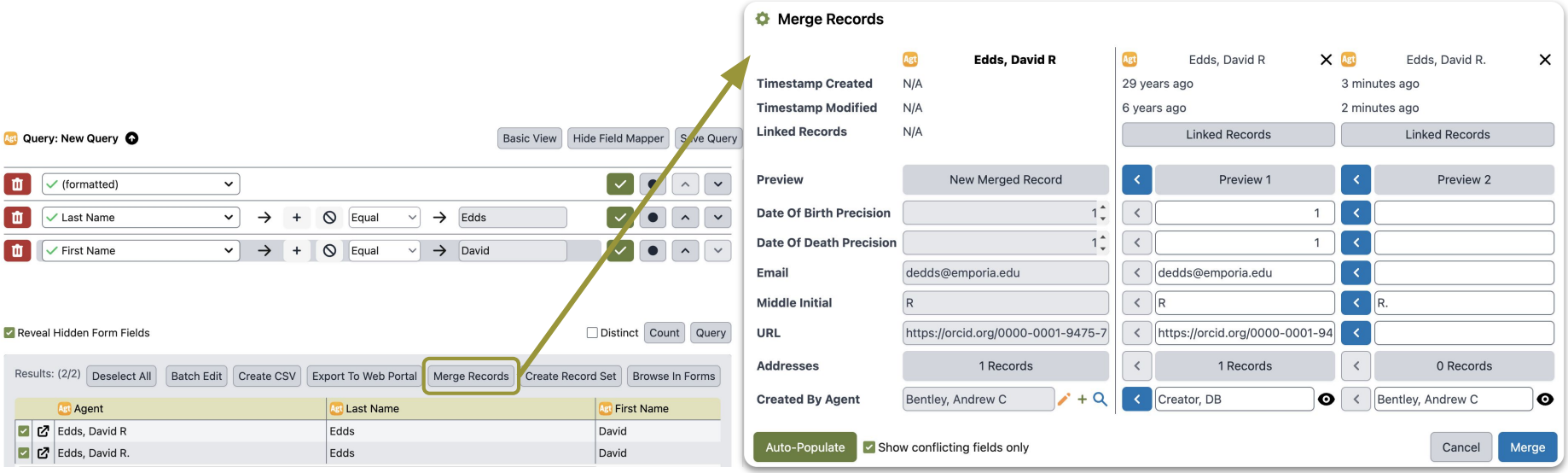
Outcome:

Prevents matching to the existing Agent; a duplicate Agent record is made where the only difference is the unnoticed conflict.



Accidental Agent Duplication

Solution: Merge duplicate Agent with the existing Agent record.



Accidental Agent Duplication

Best Practices:

1. **Use as few columns as possible for related record matching** to reduce the risk of inadvertent duplication.
2. After validating, **always pay attention to cell highlights**.
3. If no new records should be created by the upload for a certain related table, **add the Must Match preference for that table**.



More Best Practices for Bulk Actions

1. **Take a backup of the database before uploading** with the WorkBench or making changes in Batch Edit.
2. **Create a record set of records you want to edit**. Query from that record set and then Batch Edit from there to limit dataset with certainty.
3. **Always pay attention to cell highlights and review results** before uploading or committing data.
4. **Always review imported data immediately after uploading.** This way, you are more likely to be able to roll back should anything need fixed!

Thank you!

For more information:

- specifysoftware.org
- discourse.specifysoftware.org/
- support@specifysoftware.org
- membership@specifysoftware.org
- github.com/specify