

Designer Training



STARDOG



Welcome

Meet the trainer:

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Course Overview

Description:

- This beginner training is for users that are responsible for designing, building and maintaining data models. The training will discuss the basics of data modeling and will teach users how to connect resources through mapping. Users will learn how to build out a model, publish it and then view it in Explorer. They will learn how to build out inference rules and then apply these rules to their data model.

Audience:

- New Stardog users that are consumers, modelers or builders of knowledge graphs.

Pre-requisites:

- User should have a Stardog Free Cloud account and endpoint
- Users should complete the Meet Stardog and Explorer training

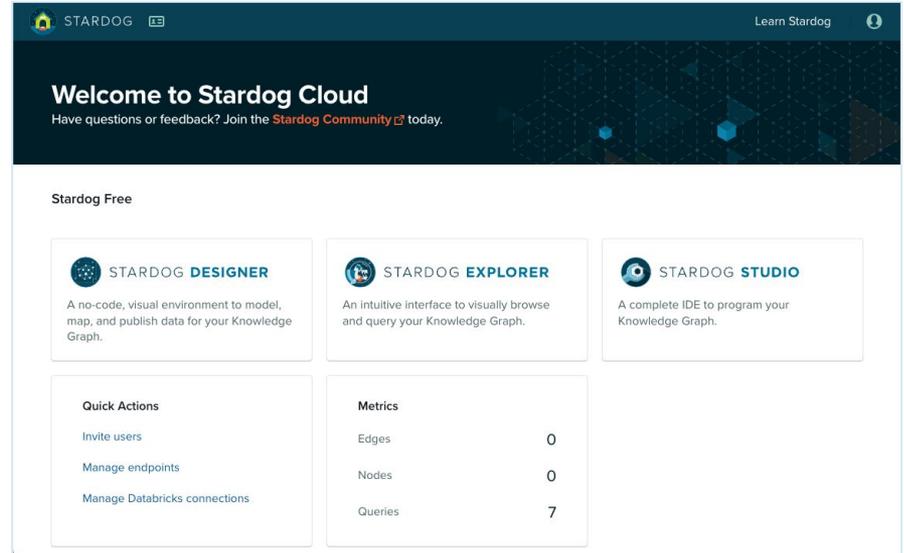
Course Objectives

After completing this training, students will be able to:

- Design a basic data model
- Create mappings to project resources
- Create and map relationships
- Create and edit attributes and labels
- Publish a model
- Create and publish inference rules

Stardog Cloud

- Manage Knowledge Graph endpoints
- Launch applications
- Sign up for Stardog Cloud plans
- Access Resource Center for guided journeys and training resources
- Invite more users



The screenshot shows the Stardog Cloud dashboard. At the top, there is a navigation bar with the Stardog logo and a 'Learn Stardog' link. Below the navigation bar, a welcome message reads 'Welcome to Stardog Cloud' with a link to the Stardog Community. The main content area is titled 'Stardog Free' and features three tool cards: 'STARDOG DESIGNER' (a no-code visual environment), 'STARDOG EXPLORER' (an intuitive interface for browsing and querying), and 'STARDOG STUDIO' (a complete IDE for programming). Below these cards, there are two sections: 'Quick Actions' with links for 'Invite users', 'Manage endpoints', and 'Manage Databricks connections'; and 'Metrics' showing 'Edges' (0), 'Nodes' (0), and 'Queries' (7).

Metrics	
Edges	0
Nodes	0
Queries	7

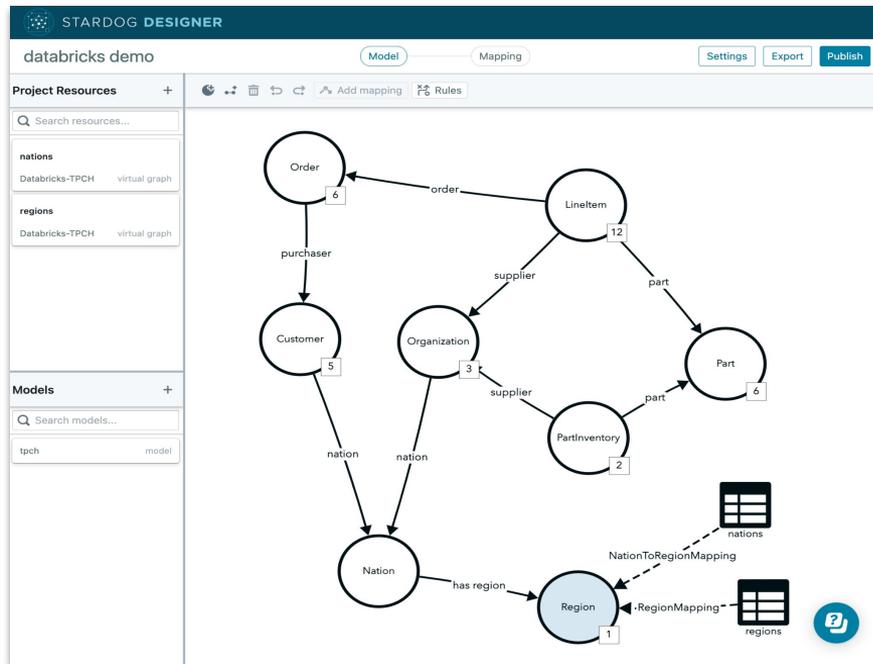
Stardog Designer

Stardog Designer

No-code, visual KG authoring

Features:

- Create & Edit data models
- Load existing models
- Define inference rules
- Knowledge Catalog powered mapping



Agenda

Data Modeling Overview

Mapping

Relationships

Publish the Model

Inference Rules

Data Modeling Overview

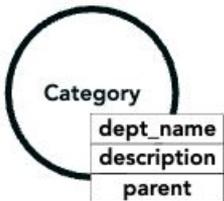
Getting Started on your first Data Model

- Start with a few key concepts
 - For each concept...
 - Define a few key attributes
 - At least one relationship
- Data models should be composable like Legos, reuse is key
- Naming
 - Data models encode the meaning of your data
 - Terminology should align with domain experts

Modeling Terminology



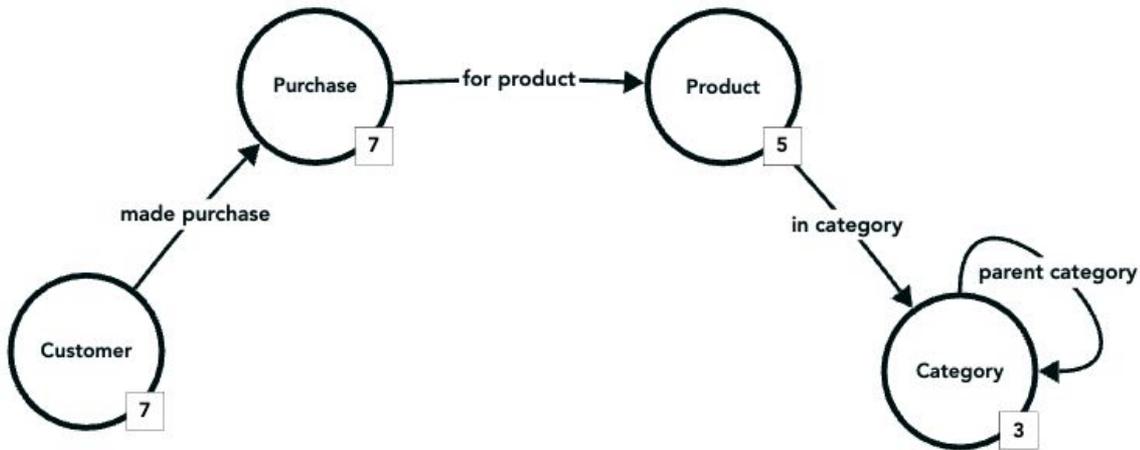
Class is a type of thing. A class can be made up of a set of individuals which are called instances.



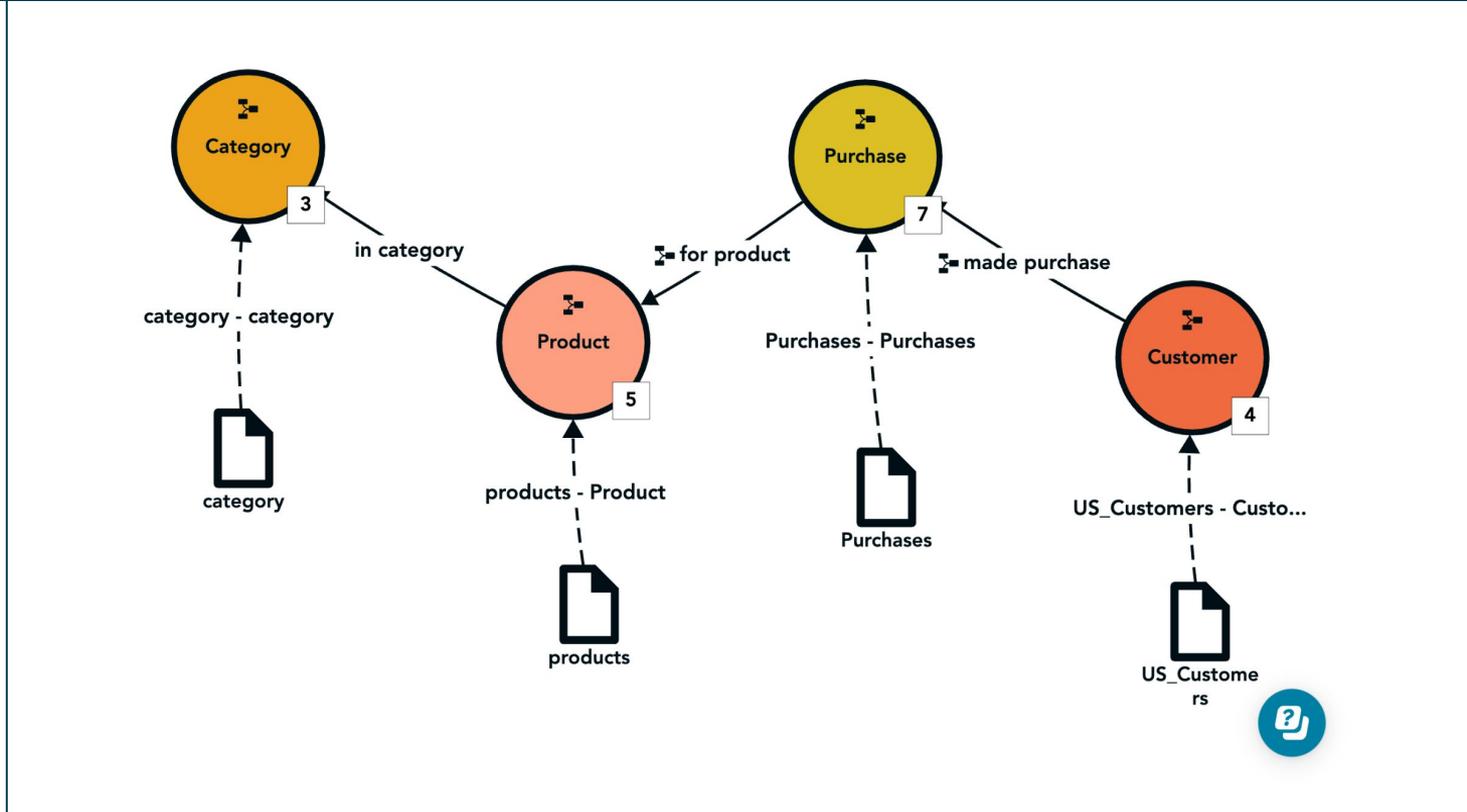
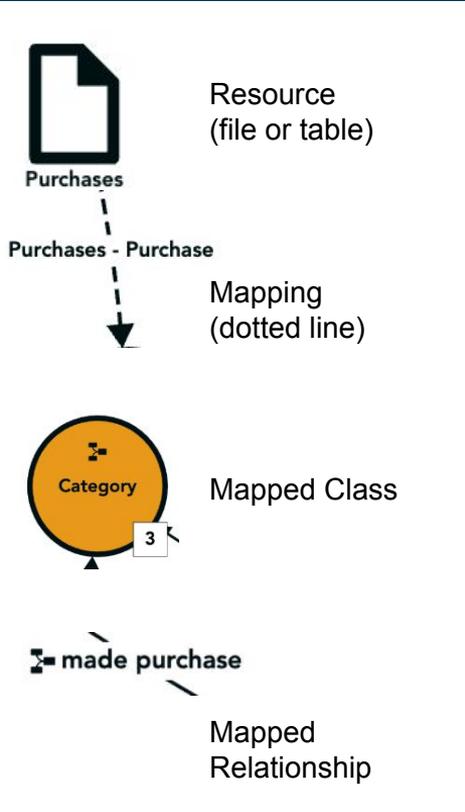
Class with 3 attributes. **Attributes** describe properties of class instances.



Relationships describe an edge between 2 objects (classes or individuals).



Designer Canvas Legend



Stardog Designer Model User Interface

The screenshot displays the Stardog Designer Model User Interface. The top navigation bar includes the 'STARDOG DESIGNER' logo and the 'Example Project' title. On the right side of the navigation bar, there are buttons for 'Settings', 'Export', and 'Publish', with a callout box labeled 'Export project' pointing to the 'Export' button. Below the navigation bar, the main workspace is divided into two sections: 'Project Resources' and 'Models'. The 'Project Resources' section has a search bar and a toolbar with icons for adding mappings and rules, and a callout box labeled 'Specify data to be mapped'. The 'Models' section also has a search bar and a callout box labeled 'Import data models from Stardog endpoints'. In the center of the workspace, there are several callout boxes: 'Create class' (pointing to a 'Create' button), 'Delete concept' (pointing to a 'Delete' button), 'Add mapping from project resource' (pointing to an 'Add mapping' button), 'Manage rules' (pointing to a 'Rules' button), and 'Toggle between Model overview and Mapping pages' (pointing to a 'Mapping' tab). On the right side of the workspace, there are callout boxes for 'Set custom project name' (pointing to a 'Settings' button) and 'Publish project to a Stardog endpoint' (pointing to a 'Publish' button).

STARDOG DESIGNER

Example Project

Project Resources

Models

Export project

Create class

Delete concept

Add mapping from project resource

Manage rules

Specify data to be mapped

Toggle between Model overview and Mapping pages

Set custom project name

Publish project to a Stardog endpoint

Settings Export Publish

Mapping

Import data models from Stardog endpoints



Editing Classes

- Edit label and description
- Customize IRI
- Manage parent and child classes
- Add relationships
- Manage attributes
- Delete class

Class Detail

Class Name
Customer

Description

Parent Classes Child Classes

Relationships

Relationship Name	Direction	
	<input type="checkbox"/> ↔ <input type="checkbox"/> ←	Add
made purchase	<input checked="" type="checkbox"/> ↔ <input type="checkbox"/> ←	

Attributes

Attribute Name	Data Type	Rule
		Add
email	string	Create
first_name	string	Create
full_name	string	Create
last_name	string	Create
location	string	Create

Delete

Editing Relationships

- Edit label and description
- Customize IRI
- Manage source and target classes
- Delete relationship

Relationship Name

made purchase

Description

Source

Customer

×

Target

Purchase

×

Source	Target
Customer	Purchase

Delete

Editing Attributes

- Edit label and description
- Customize IRI
- Edit Data Type
- Manage class associations
- Manage sensitive property group member
- Delete attribute

< Attribute Detail

×

Attribute Name

email

Description

Data Type

string

Associations

Customer

Sensitive Property Groups

+ Create

Q Filter

Name

Other attributes

Delete

The Store Demo Data Set

Purchases

id	pid	date	cid
100% distinct 2500 records	22.84% distinct 2500 records	76.48% distinct 2500 records	19.80% distinct 2500 records
bad78090-e88e-40f...	176	2019-08-08	206
9ebf4c10-95de-449...	220	2019-04-19	18
20578c3c-1b31-44d...	237	2021-07-02	257
f69b0158-58f4-48e...	522	2012-08-16	342
92b06e51-b244-4e5...	182	2015-05-20	278

products

id	product	msrp	dept
100% distinct 580 records	98.79% distinct 580 records	99.83% distinct 580 records	4.66% distinct 579 records
1	Ring Light	568.66	8
2	Wireless Charger	275.17	8
3	Notebook	492.14	23
4	Snowglobe	589.83	21

US_Customers

cid	first_name	last_name	email
100% distinct 500 records	97% distinct 500 records	99.40% distinct 500 records	100% distinct 500 records
1	Gabriello	Stocky	gstocky0@umich.edu
2	Merna	Fruchter	mfruchter1@g.co
3	Nelly	Bloys	nbloys2@nps.gov
4	Orren	Adne	oadne3@goo.gl

category

id	dept_name	parent
100% distinct 31 records	100% distinct 31 records	55.56% distinct 9 records
1	Shoes	2
2	Clothing	
3	Garden	
4	Toys	

The Store Demo Data Set

Purchases

id	pid	date	cid
100% distinct 2500 records	22.84% distinct 2500 records	76.48% distinct 2500 records	19.80% distinct 2500 records
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f69b0158-58f4-48e...	522	2012-08-16	342
02b06e51-ba44-4ae...	182	2015-05-17	270

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Exercise

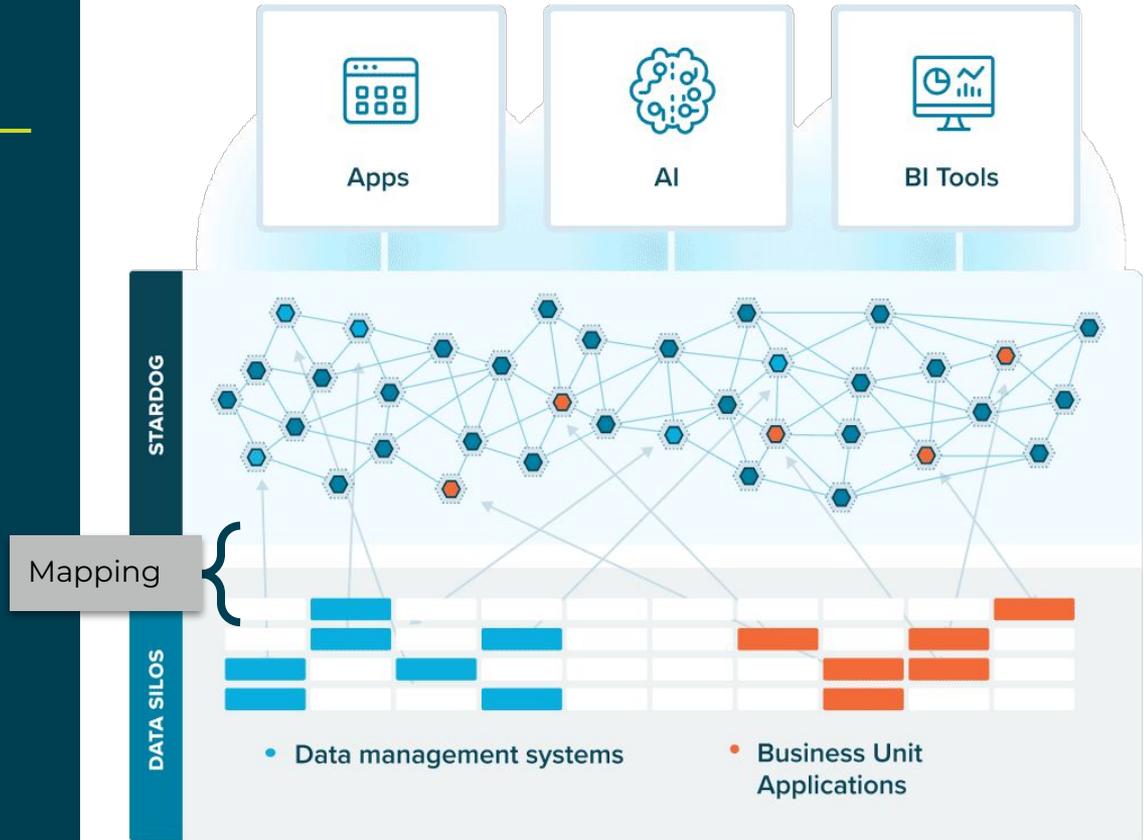


- Open the Exercise Guide
- Complete Exercise 1 & Exercise 2

Mapping

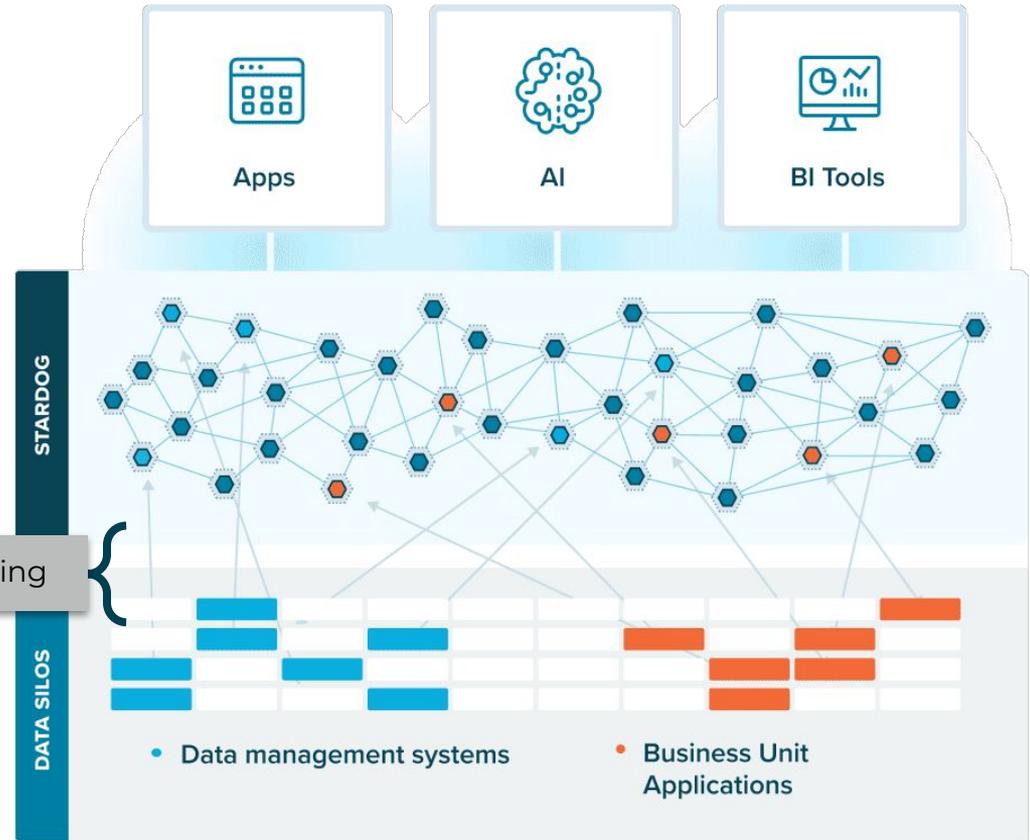
Where Mapping sits

- Mapping happens at the junction between the 2 worlds of RDB and Graph
- In your data you have
 - Files and Tables
 - Column
 - JoinsThat will become or be “mapped to”
 - Classes
 - Attributes
 - RelationshipsIn the graph world



Building an Enterprise Knowledge Graph

- Data remains in situ
- App “sees” the KG via the model
- Data is ‘mapped’ into the KG
 - Link atomic data elements to your data model
 - Raw data can later be cached or persisted for better query performance
- Data can support multiple mappings, models

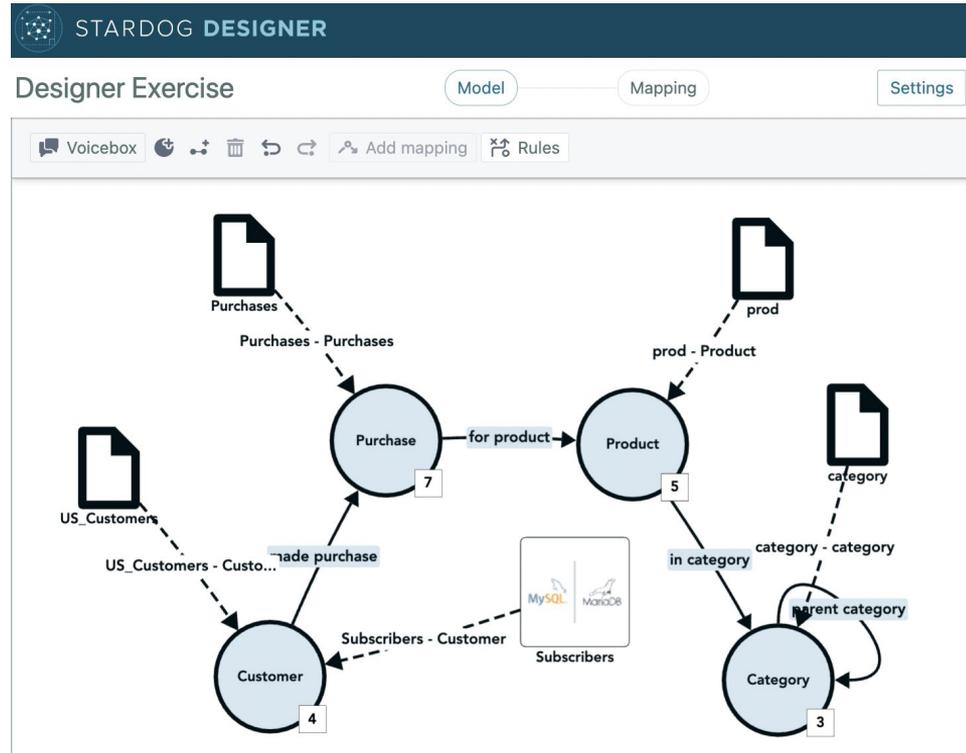


Mapping Project Resources

Designer facilitates mapping new data sources to Stardog.

Supported data sources include:

- CSVs
- JDBC Data Connections



CSVs

- Rename resource and column headers
- See summary statistics and data preview
- Customize separator, quote, and escape characters

Add a new project resource

Source: products.csv

Resource name: Product

Resource Properties

Separator character: , Quote character: " Escape character: \"

Has header Skip empty values

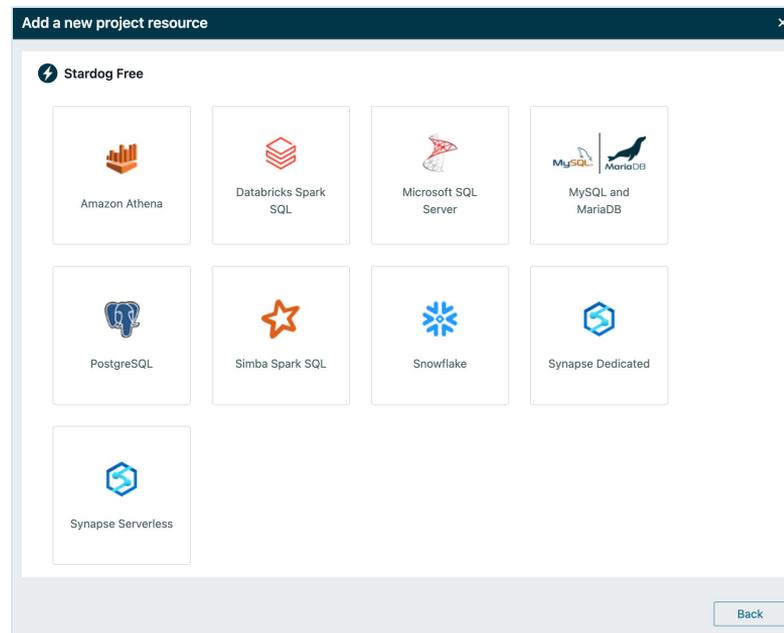
Preview 25 samples

id	product	msrp	dept	description	thumb
100% distinct 580 records	98.79% distinct 580 records	99.93% distinct 580 records	4.66% distinct 579 records	100% distinct 580 records	0.69% distinct 580 records
1	Ring Light	568.66	8	This Ring Light is per...	http://dummyimage.c...
2	Wireless Charger	275.17	8	The Wireless Charge...	http://dummyimage.c...
3	Notebook	492.14	23	The Notebook is the ...	http://dummyimage.c...
4	Snowglobe	589.83	21	A Snowglobe is a de...	http://dummyimage.c...
5	Picture Frame	243.66	21	This classic wooden ...	http://dummyimage.c...
6	AA Battery	498.0	7	AA Battery is a long-l...	http://dummyimage.c...
7	AAA Battery	203.02	7	AAA batteries are sm...	http://dummyimage.c...
8	9V Battery	407.85	7	A 9V alkaline battery ...	http://dummyimage.c...
9	Facial Tissues	241.37	19	Facial Tissues are so...	http://dummyimage.c...
10	Toilet Paper	264.15	20	Soft and strong two...	http://dummyimage.c...
11	Paper Towels	365.78	20	Paper Towels are abs...	http://dummyimage.c...
12	Dish Towels	56.76	20	These absorbent dis...	http://dummyimage.c...
13	Gaming Console	943.17	22	A gaming console is ...	http://dummyimage.c...
14	Video Game	786.23	22	Video Game is an int...	http://dummyimage.c...
15	Stuffed Animal	599.21	4	This adorable stuffe...	http://dummyimage.c...
16	100 pc Puzzle	655.1	4	This 100 pc Puzzle is...	http://dummyimage.c...

Back Create Create & Map

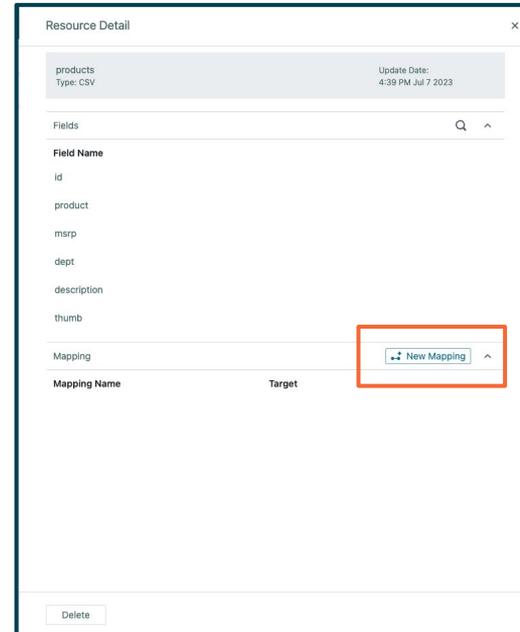
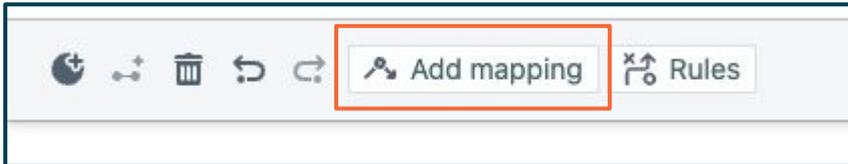
Virtual Graphs via JDBC Data Connections

- Select database tables or select data with a custom query
- Rename resource and column headers
- Includes Data preview



Add mapping

- Toolbar button for **Add mapping** when a resource is selected
- **New Mapping** button on resource details
- **New Mapping** button on Mapping view



Stardog Designer Mapping User Interface

The screenshot shows the Stardog Designer Mapping User Interface. The top navigation bar includes the Stardog Designer logo, the text "Example Project", and buttons for "Settings", "Export", and "Publish". Below the navigation bar, there are two tabs: "Model" and "Mapping". A callout bubble points to the "Mapping" tab with the text "Toggle between Model overview and Mapping pages".

On the left side, there is a navigation tree. A callout bubble points to it with the text "Navigation tree of project resource, class, and mappings". The tree shows a hierarchy: "products" (expanded) -> "products" (expanded) -> "products - products" (selected).

The main content area displays the "Mapping" page for the "products - products" resource. It features a "Suggest Mapping" button and a "Primary Identifier" field. Below this, there is a section for "Attribute" with a table of attributes:

Attribute Name	Type	Mapping	Actions
dept	integer	dept	...
description	string	description	...
id	integer	id	...
msrp	string	msrp	...
product	string	product	...
thumb	string	thumb	...
vendor	string	vendor	...

At the bottom left corner, there is a blue circular icon with a white question mark.

Exercise



- Complete Exercise 3 - Upload Your Data
 - Upload and map data

- Complete Exercise 4 - Edit Classes

Relationships

The Store Demo Data Set

Purchases

id	pid	date	cid
100% distinct 2500 records	22.84% distinct 2500 records	76.48% distinct 2500 records	19.80% distinct 2500 records
bad78090-e88e-40f...	176	2019-08-08	206
9ebf4c10-95de-449...	220	2019-04-19	18
20578c3c-1b31-44d...	237	2021-07-02	257
f69b0158-58f4-48e...	522	2012-08-16	342
02b06c51-bc44-4c5...	...	2015-05-20	...

products

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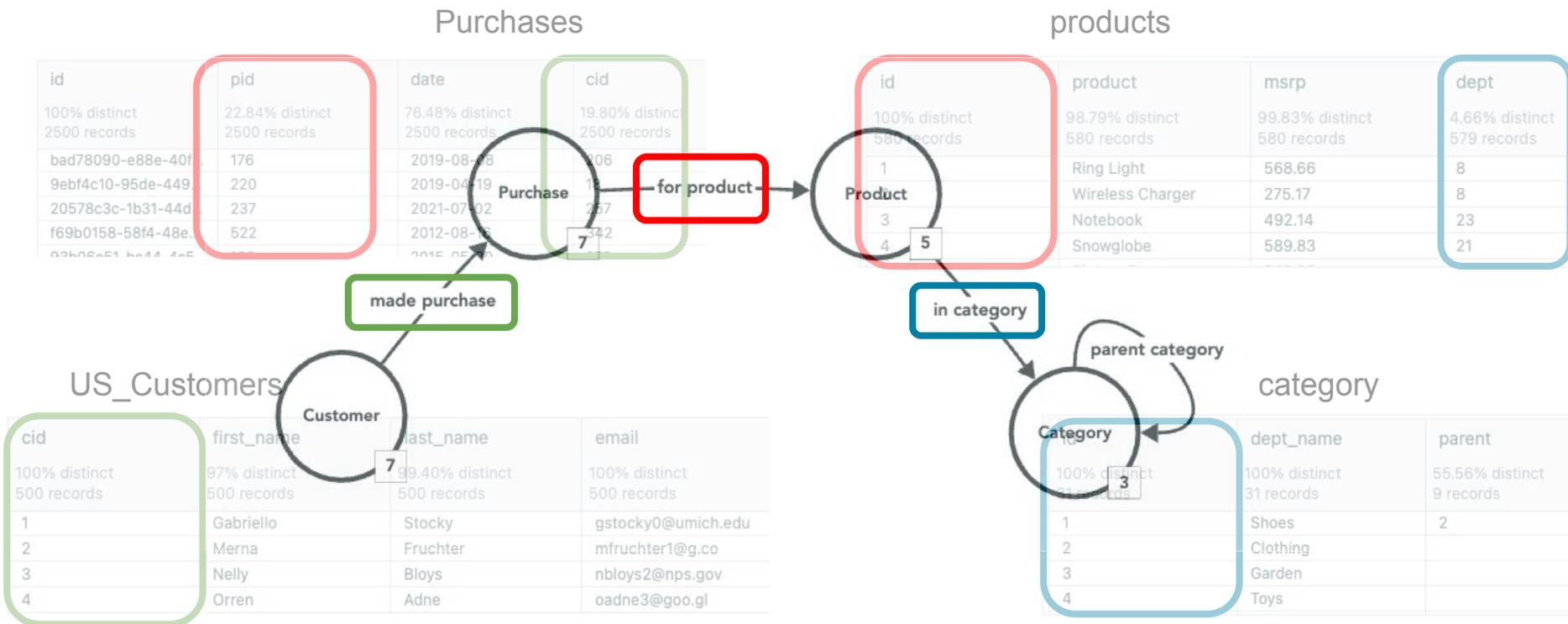
US_Customers

cid	first_name	last_name	email
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category

id	dept_name	parent
100% distinct 31 records	100% distinct 31 records	55.56% distinct 9 records
1	Shoes	2
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3	Garden	
4	Toys	

The Store Demo Data Set



Exercise



- Complete Exercise 5 - Create and Map Relationships
- Review

Publish the Model

Database

- Select an Endpoint
- Select or create a database
- Modify model namespace
 - Prefix
 - IRI
- Download export

The screenshot shows a 'Publish Project' dialog box with a progress indicator at the top showing three steps: 'Database', 'Configure Model', and 'Configure Mappings'. The 'Database' step is currently active. Below the progress bar, there is a 'Database' section with a dropdown menu labeled 'Select or create'. Underneath, there is a toggle for 'Add Model Namespace' which is turned on. Below the toggle, there are two input fields: 'Prefix' with the value 'BuildaKG_Training' and 'IRI' with the value 'tag:stardog:designer:BuildaKG_Training:model:'. At the bottom of the dialog, there is a checkbox for 'Download zipped project when publishing' which is checked, and two buttons: 'Cancel' and 'Next'.

Project Export

- Data Model
 - In Turtle (.ttl) format
- Project Resource mappings
 - Mapping file in Stardog Mapping Syntax (SMS) format
 - Properties file
 - (For CSV resources) Original CSV
- Stardog Designer Project definition
 - With extension .stardogdesigner

Configure Model

- Create or replace an existing model

Publish Project ×



Database Configure Model Configure Mappings

Model Configuration

Create new model

Replace an existing model

Customize Advanced Model Details

Download zipped project when publishing

[Back](#) [Next](#)

Configure Mappings

- Choose how to publish resources
 - Create new
 - Replace
 - Append

Publish Project ✕

● Database —● Configure Model —○ Configure Mappings

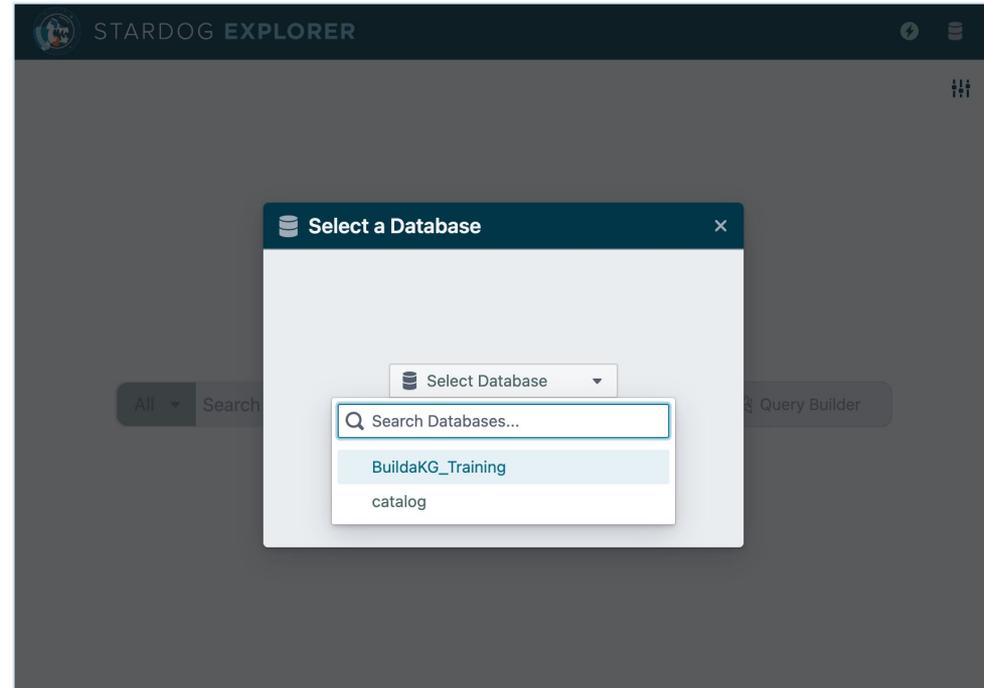
Resource	Mappings	Configuration	
Customers	Customers - Customers	<input type="radio"/> Create new <input checked="" type="radio"/> Replace <input type="radio"/> Append	▼
		tag:stardog:designer:...	
category	category - category category - Category	<input type="radio"/> Create new <input checked="" type="radio"/> Replace <input type="radio"/> Append	▼
		tag:stardog:designer:...	
products	products - products products - Category	<input type="radio"/> Create new <input checked="" type="radio"/> Replace <input type="radio"/> Append	▼
		tag:stardog:designer:...	
Purchases	Purchases - Purchases Purchases - Product Purchases - Customer	<input type="radio"/> Create new <input checked="" type="radio"/> Replace <input type="radio"/> Append	▼
		tag:stardog:designer:...	

Download zipped project when publishing

[Back](#) [Publish](#)

Validate Model in Explorer

- Go to <https://cloud.stardog.com>
- Open Explorer
- Select database
- Select visualize



Exercise



- Complete Exercise 6 - Publish your project
- Review

Inference Rules

What is the power of inferencing?

Differentiates Graph from Knowledge Graph

- Make the implicit explicit
- Enables a Semantic Layer
- Formally define your business logic, **no-code**
 - Use your model to infer new edges and classes
 - Rules stay with the model!
- Inferences are computed at **query time**
 - Enables Data Fabric with Virtualization

Inference Structure

- Rules are written in an **IF...THEN...** structure
- The **IF** clause is very similar to a select query
 - The **IF** clause defines the set of conditions under which the rule is applied
- The **THEN** clause specifies the inference
 - Rules can:
 - Define a new attribute
 - Define a relationship between two instances
 - Define an existing instance as an additional type/class

Building Rules

- **IF** clause specifies the conditions that are to be met. Follows the same structure as the Query Builder
- **THEN** clauses allow you
 - to classify instances as members of a class
 - to assert relationships between instances in classes
 - to assert attributes in instances of a class

Rule Detail

Rule Name

Large Purchases

When the following conditions are met:

Purchase — price > 20000

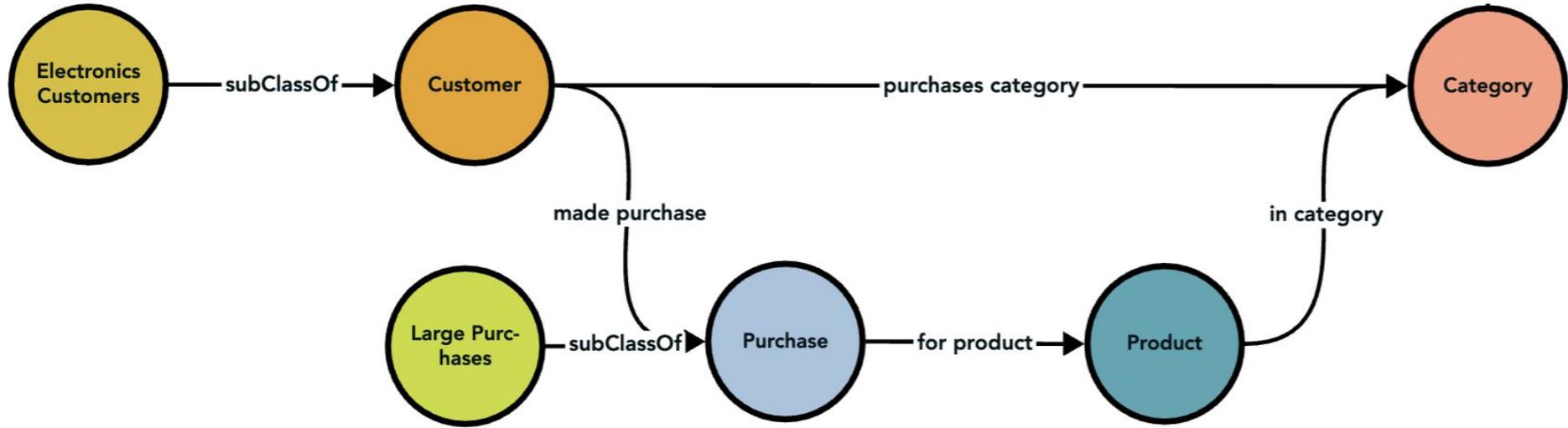
⊕ AND

Then infer:

Purchase — Classify As — Large Purchases

⊕ AND

Inference Examples...



- “Electronics Customers” and “Large Purchases” are inferred classes
- “purchases category” is an inferred relationship

Exercise



- Complete Exercise 7 - Create a new Designer Project and import a model
- Complete Exercise 8 - Create inference rules

Exercise

- Complete Exercise 9 & 10 - Publish your project and view it in Explorer
- Review



Exercise

Instructions

- Open Settings and change the model to **Model you just published** and turn reasoning on
- Build the following query using the query builder. Big Spenders that made a large orders after Jan 1, 2022. Save and run the query

Review

Course Review

1 Data modeling basics

2 Creating and editing the data model properties

3 Mapping project resources in Designer

4 Publishing the model and viewing in Explorer

5 Inference Rules and Reasoning

Questions?



Thank You!

Tell us what you think:

<https://www.surveymonkey.com/r/PostCourseInstructor>

To contact Stardog about training please email:

training@stardog.com





STARDOG

