



Comparing Logical and Physical ERD

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A logical ERD models information gathered from business requirements. The entities and relationships modeled in such an ERD are defined around the business's needs. The need to satisfy the database design is not yet considered.

A physical ERD represents the actual design of the database. It deals with the conversion from a logical design into a schema-level design that will be transformed into a relational database. When modeling a physical ERD, the logical ERD is treated as the base, and refinement occurs by defining primary keys, foreign keys, and constraints. Sometimes, relationships need to be resolved by introducing additional tables, such as a linked table for a many-to-many relationship.

Since the physical ERD and logical ERD represent the business requirement and database schema, respectively, comparing the physical and logical ERDs helps to identify the differences between them, thus confirming that the database is exactly following the initial business requirements, regardless of any changes.

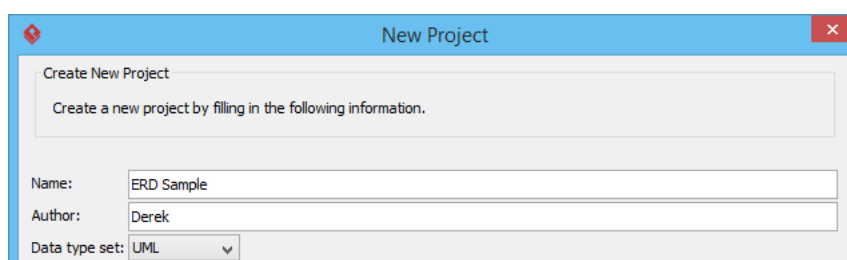
[Visual Paradigm](#)'s Model Transitor enables you to transition a logical ERD to a physical ERD while maintaining the transition relationship. In this tutorial, we'll see how to use the Model Transitor to transcribe a logical ERD into a physical ERD. After that, we will use Visual Diff, a tool for comparing changes between diagrams, to trace the differences between them.

To complete this tutorial, you must have Visual Paradigm installed. You also need to have a basic knowledge of database design and data modeling with Visual Paradigm.

Create a Project for This Tutorial

To avoid messing up your production data, we will create a new project for this tutorial. In this section, you will create such a project.

1. Select **Project > New** from the toolbar.
2. Enter *ERD Sample* as the project name.

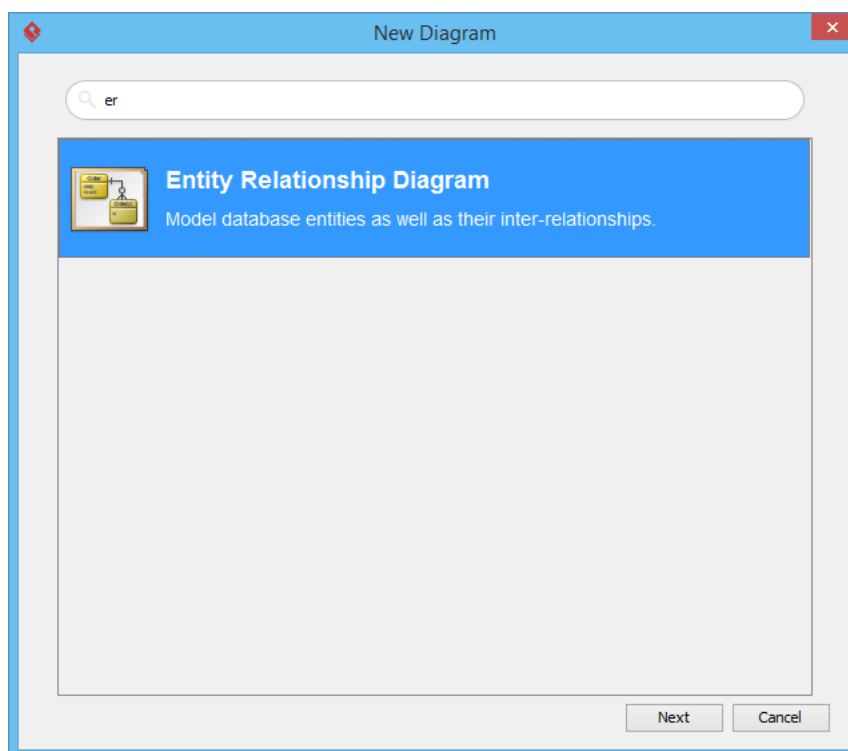


3. Click **Create Blank Project** to confirm the creation.

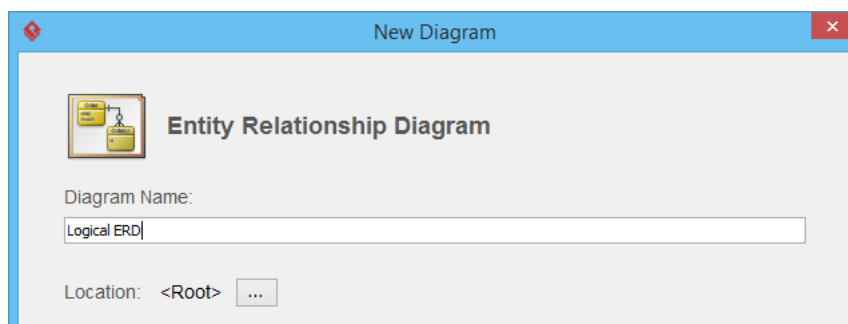
Drawing a Simple Logical ERD

In this section, we will draw a simple logical ERD that contains just two entities.

1. Select **Diagram > New** from the toolbar.
2. In the **New Diagram** window, select **Entity Relationship Diagram** and click **Next**.

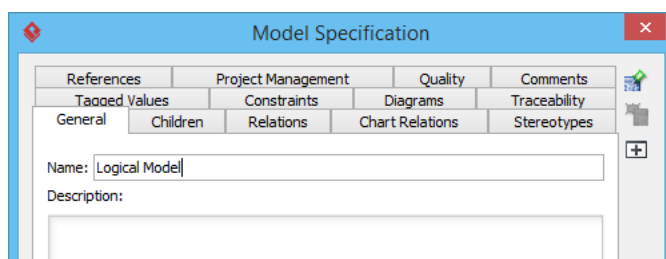


3. Enter *Logical ERD* as the diagram name.

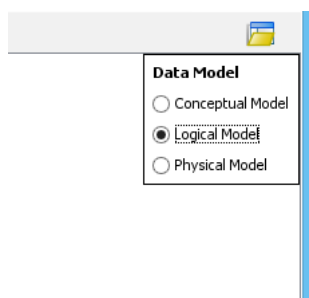


4. Let's put the ERD to be created in a model for better grouping. Click ... next to **Location**.
5. In the **Select Parent Model** window, click **New Model**.

- In the **Model Specification** window, enter *Logical Model* as the name and click **OK**.



- Click **OK** in the **Select Parent Model** window.
- Click **OK** to confirm the creation of the Entity Relationship Diagram. On the right-hand side of the diagram, you should see a floating panel called **Data Model**, with the option **Logical Model** selected. If you find that **Physical Model** is selected, it's possible that you have entered the wrong name in step 6. If that's the case, select **Logical Model** manually now.

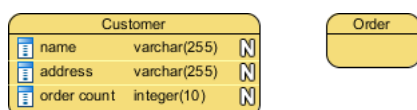


- Click on the background of the diagram. The **Data Model** panel will then disappear.
- Draw two entities, *Customer* and *Order*, in the ERD.



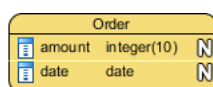
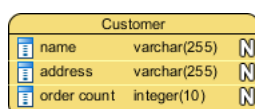
- Add the following columns to the *Customer* entity:

Column
name : varchar(255)
address : varchar(255)
order count : integer (10)



- Add the following columns to the *Order* entity:

Column
amount : integer (10)
date : date

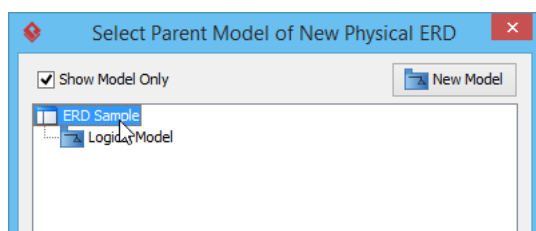


That's all for our logical ERD. Since it aims to represent business requirements, it's quite simple, and as you can see, we haven't added any keys yet.

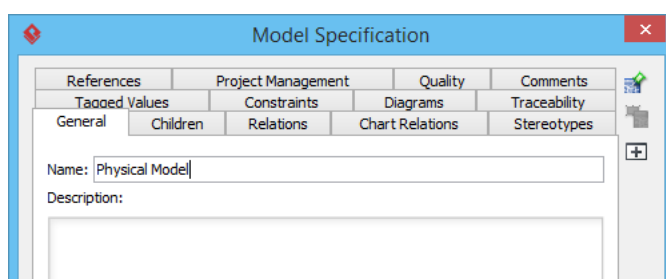
From Logical ERD to Physical ERD

In this section, we will form a physical ERD from the logical ERD we drew in the previous section.

- Right-click on the background of the logical ERD and select **Utilities > Transit to Physical ERD...** from the popup menu.
- This time, let's group the diagram to be created in a model named *Physical Model*. In the **Select Parent Model**, click on the project root node first.

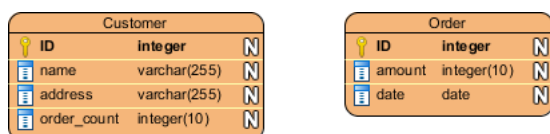


- Click **New Model**.
- In the **Model Specification** window, enter *Physical Model* as the name and click **OK**.



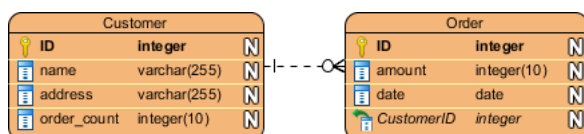
- Keep **Physical Model** selected in the **Select Parent Model** window and click **OK**.

- You should see a new ERD formed, which looks quite similar to the logical ERD, except that the entities are in orange and have a primary key column automatically created.

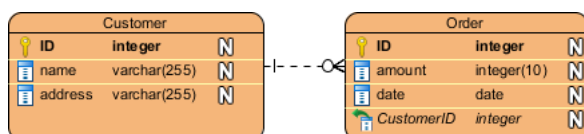


Now, let's modify it to make the diagram a real physical ERD.

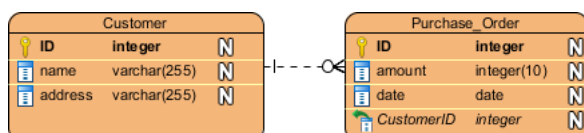
- First, one *Customer* can have multiple *Orders*. Let's connect them with a one-to-many relationship. Click **OK** when prompted for the creation of a foreign key column.



- The *order_count* column is redundant because the number of orders can be obtained by counting the number of *Order* records associated with a particular customer. Let's delete this column. Select it and press **Delete**.



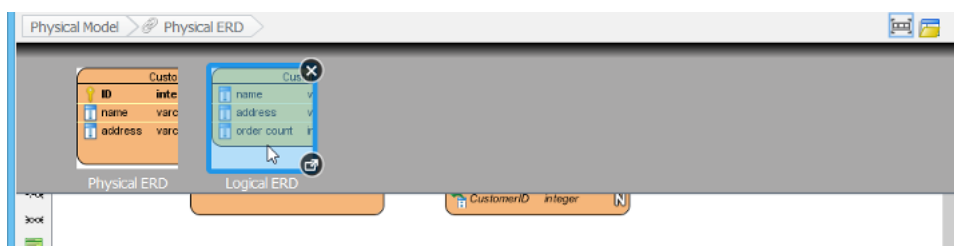
- "Order" is a reserved word that cannot be used as a table name. Let's rename the *Order* entity to **Purchase_Order**.



Comparing a Logical and Physical ERD with Visual Diff

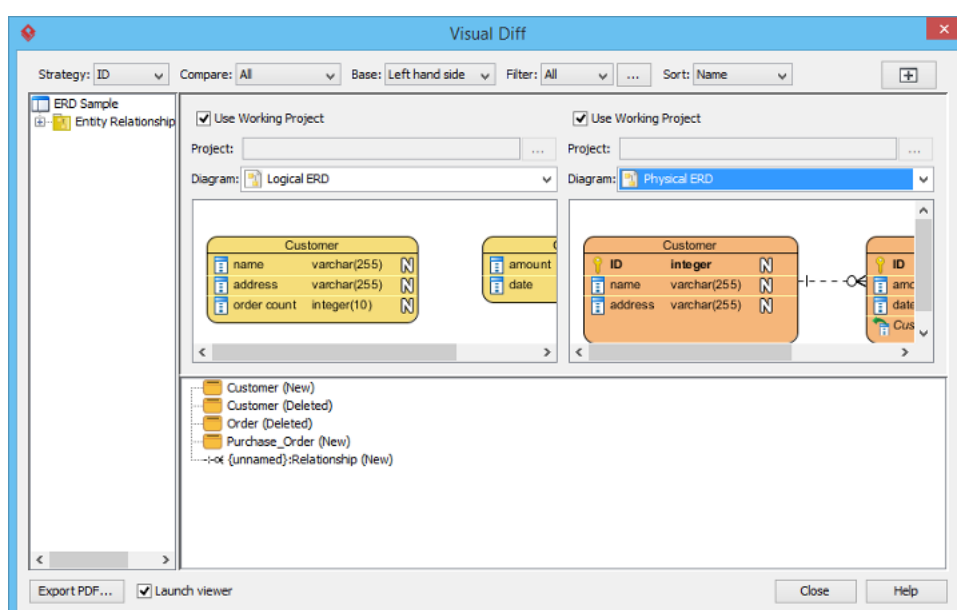
Let's compare the two ERDs. Doing so allows us to see the differences between the logical model and the physical model.

1. Let's open the logical ERD. To do so, click on **Switch Diagram** on the navigation bar and then double-click on the logical ERD to open



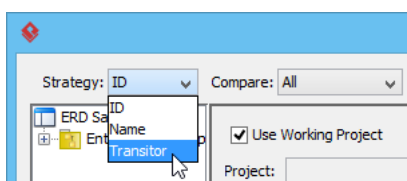
it.

2. Select **Modeling > Visual Diff** from the toolbar.
3. Select the physical ERD on the right-hand side of the Visual Diff window.



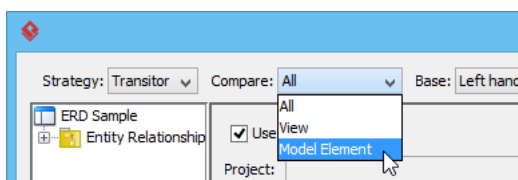
- **Top:** Settings for controlling how and what to compare.
- **Left-hand side:** A list of diagrams in the two projects selected on the left and right-hand sides.
- **Middle:** A pane that has two sides. Each side represents a project and one of its diagrams. A comparison is made for the two sides.
- **Bottom:** The differences between the two diagrams are shown here.

- At the top left corner of the Visual Diff window, select **Transitor** as the comparison strategy.



There are three types of strategies:

- ID:** Shapes will be matched based on their internal model element ID. This type of comparison is useful for visualizing differences between different stages of a design.
 - Name:** Shapes will be matched based on their names. This type of comparison is useful for visualizing differences in external works. Typical examples include comparing databases and class models.
 - Transitor:** Shapes will be matched based on their transition established by the Model Transitor. This type of comparison is useful for visualizing differences between different models.
- Next to the **Strategy** setting, there is a drop-down menu for selecting what to compare. For **View**, differences like the coordinates of a shape will be reported. For **Model Element**, differences such as the name of a model element or other specification-level changes will be reported. Since we are only interested in knowing the differences at the schema level, select **Model Element**.



- Check the results. The differences between the logical and physical ERDs can now be easily found.

Related Links

- [Tutorial - Comparing Database Schemas Visually](#)
- [FREE database design training - Database Design and Management](#)
- [What is Entity Relationship Diagram \(ERD\)?](#)



Visual Paradigm home page
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