Visual Paradigm
ERD Tutorial: How to Design and Generate SQL Server DB?

Tutorial

Visual **Paradigm**

# ERD Tutorial: How to Design and Generate SQL Server DB?

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You can design database with ERD, and construct database by generating from the resulting ERD. In this tutorial, you will draw a simple ERD of an online bike shop, define sample data for your database and generate database to Microsoft SQL Server from it. Visual Paradigm and SQL Server 2014 will be used in this tutorial.

Create database in SQL Server

The first thing we need to do is ready brand new database in SQL Server. To create a new database in SQL Server:

1. Open the **SQL Server Management Studio**.
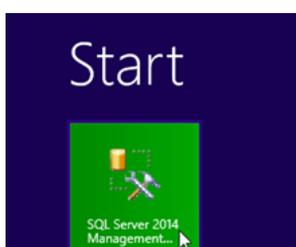
2. Login to your SQL Server.

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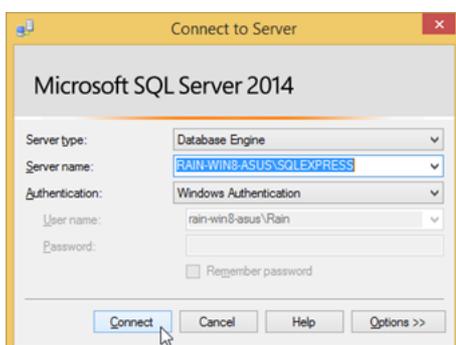
3. Right-click on **Databases** root node in **Object Explorer**, and select **New Database**.
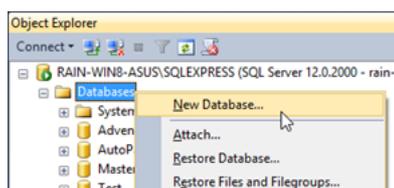
4. Name the database as *BikeShopDB*, and press **OK** to create the database.
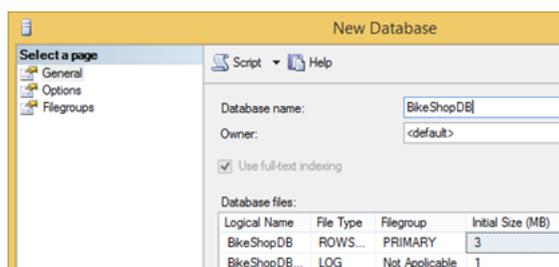
Once the database was created, we can then prepare our Visual Paradigm software for model your database.

Configure default database for your project

Visual Paradigm supports database modeling for multiple DBMS. Since each database do have their own data type which may not compatible with other database, it is important to specify the SQL Server as our default database before we start modeling. The data type for SQL Server will available in our ER diagram once we specified it as our default database. To configure the default database in Visual Paradigm:

1. Go to **Tools > DB > Database Configuration**.

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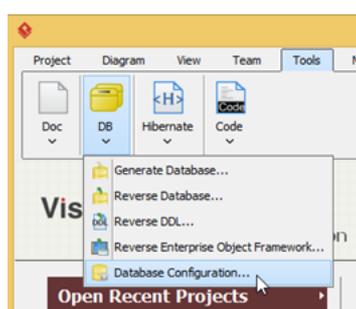
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2. Select **MS SQL Server** in the database list.
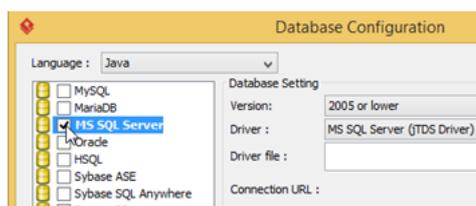
3. Select **2008 or higher** in Version field (as we are using SQL Server 2014).
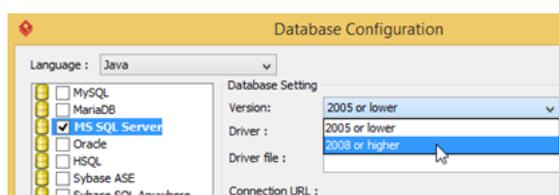
4. In this tutorial, we will use the jDTS driver for establish connection with our database. Press the green arrow button next to **Driver file** field to let VP download the driver for you.
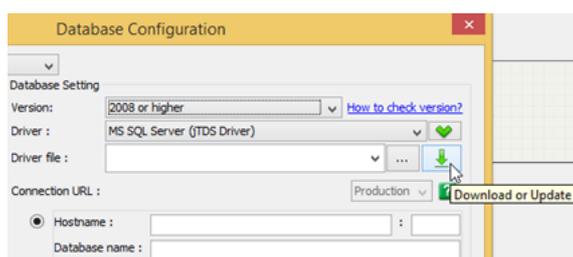
If you wish to use other driver you can then simply select the appropriate driver in the **Driver** field, and press the **...** button to locate your driver file from your local file system.

5. Fill in the hostname or IP address of the machine which hosting your SQL Server in the **Hostname** field. And fill in the post number of your SQL Server instance in the **Port** number field. After that enter *BikeShopDB* in the **Database name** field, as well as your name and password for accessing the database.

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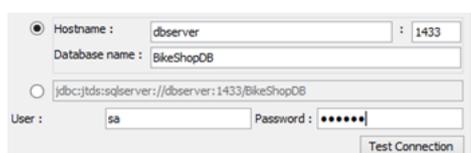
6. When finish enter the connection details, press **Test Connection** button to check everything alright.
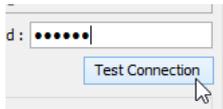
Now we are ready to start model our database in ERD.

Model your database with ERD

Let's start model our bike store database with ERD.

1. Go to **Diagram > New** to open the **New Diagram** dialog.
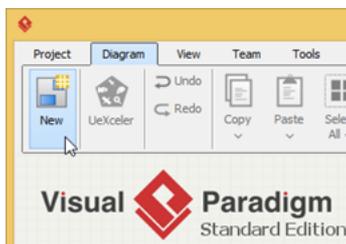
2. Enter *erd* in the search box to locate the **Entity Relationship Diagram**. Press **Next** to proceed.
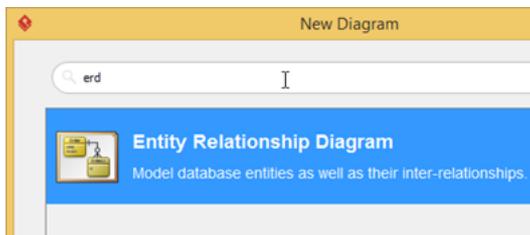
3. Name the ERD as *BikeShop*, and press **OK** to create the blank ER diagram.

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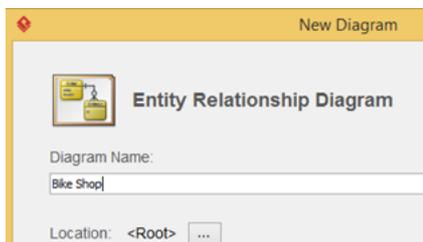
4. Select **Entity** from the diagram toolbar. Then click on the diagram to create an entity. Name it as *Item* and press **Enter** to confirm editing.
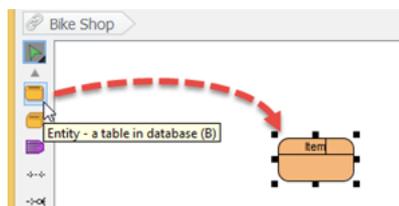
5. Right-click on the *Item* entity and select **New Column** from popup menu.
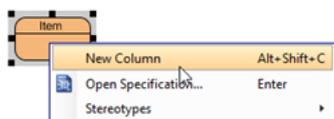
6. Enter *+ID : int* and press **Enter** to create a primary key column ID with type as int.
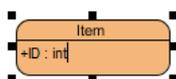
7. By default a new column will be created and in editing mode upon you confirm the previous column. Now enter *name : varchar(255)* and *price : float(2)* for the next 2 columns.
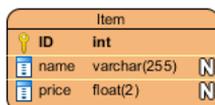
8. Press **Esc** key on keyboard to stop editing of the *Item* entity.

9. Every *Item* may contains various variations, i.e. a bike jersey will have different size and color. Let's create *ItemVariant* entity from *Item* entity with one-to-many-relationship. Move the mouse pointer over the *Item* entity. Press on **One-to-Many Relationship -> Entity** and drag it out.

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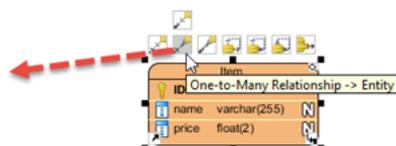
10. Release the mouse button and name it as *ItemVariant*.
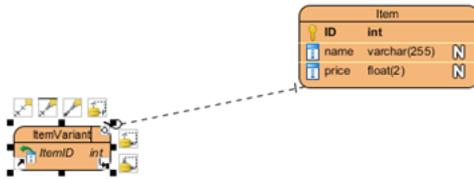
11. Right-click on *ItemVariant* entity and select **New Column** from popup menu, then enter the following columns.

Column Name	Type
+ID	int
detail	varchar(255)
color	varchar(30)
size	varchar(50)
qty	int

12. Repeat the steps above to create the ERD as below.

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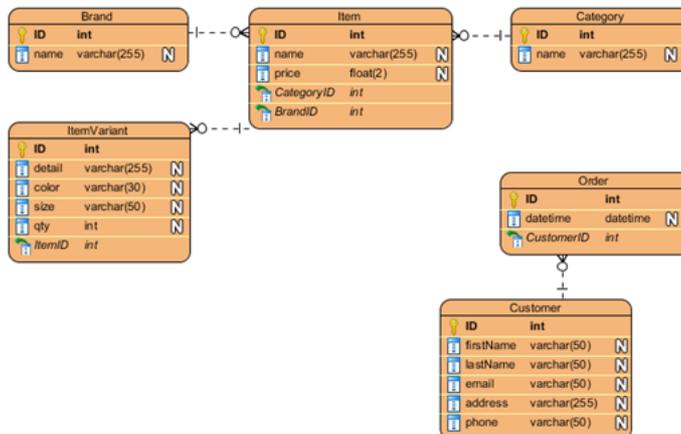
13. Finally we have to store the items purchased on each order. We should relate the *Order* with *ItemVariant* instead of *Item* since the *ItemVariant* is the entity storing the actual item. As each *Order* could have multiple *ItemVariant*, and each *ItemVariant* could be involved in multiple *Order*, therefore it should be created as many-to-many relationship. Move the mouse pointer over the *Order* entity. Press on the **Many-to-Many Relationship -> Entity** and drag it out, then drop it on ItemVariant</.
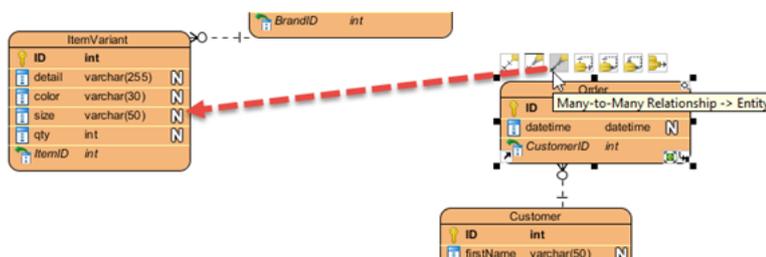
14. Now a link entity between *Order* and *ItemVariant* is being created. Rename the link entity to *OrderLine*.

15. Right-click on *OrderLine* and select **New Column** from popup menu, then enter *qty : int*.
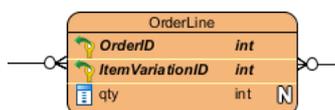
Now our ERD is ready and we can start define the sample data for our database.

Define sample data

Defining sample data for your ERD will helps you have more understanding about how your database works. The sample data will also being generated into database thus saving your time to prepare the sample in order to trial run your database. To define sample data for your ERD:

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1. Right-click on the blank area of your ERD and select **Show Table Record Editor or View Editor**.
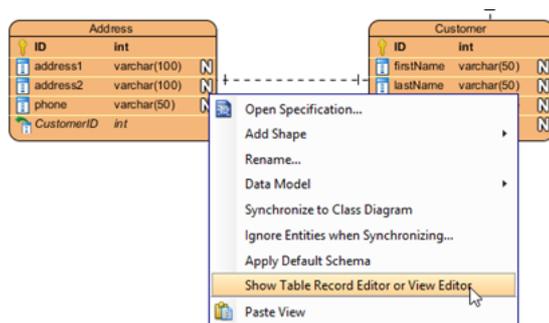
2. Select the entity *Customer* in diagram. Now you will see the **Table Record Editor** showing the columns of the *Customer* entity.
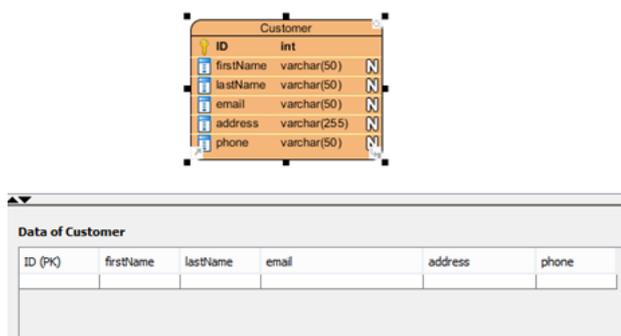
3. Enter the following details of the customer into Table Record Editor.

ID (PK)	firstName	lastName	email	address	Phone
1	John	Doe	john.doe@demo-vp.com	1205, river side	12345678
2	Peter	Pan	peter.pan@demo-vp.com	306, cox road	87654321
3	Mary	Jane	mary.jane@demo-vp.com	52, wolf hill	12358764

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4. Let's move on to the *Order* entity. Since the *Order* must be ordered by someone, we can pick the *Customer* record when fill in the sample data for *Order*. Press the **...** button in the FK cell in **Table Record Editor**.
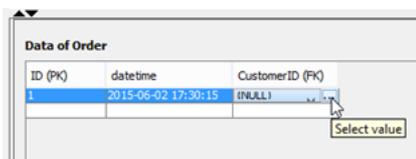
5. This will bring up the sample data we defined for *Customer*. Choose *Peter* form the list and FK value for *Peter* fill in for you in the *Order* record.
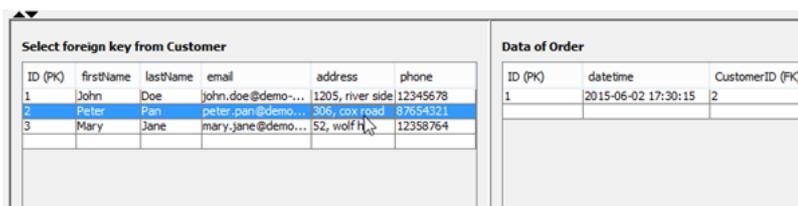
6. Repeat the above steps to define the following sample data.

    Order

ID (PK)	datetime	CustomerID (FK)
1	2015-06-02 17:30:15	2
2	2015-06-02 18:20:22	1

    Brand

ID (PK)	name
1	3R
2	Red Line

    Category

ID (PK)	name
1	Components
2	Cloths

    Item

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ID (PK)	name	price	CategoryID (FK)	BrandID (FK)
1	Handle Bar	799	1	1
2	Head Set	999	1	2
3	Jersey	299	2	1
4	Shpes	1599	2	1

ItemVariant

ID (PK)	detail	color	size	qty	ItemID (FK)
1	full carbon	black	NA	50	1
2	NA	black	NA	40	2
3	NA	pink	NA	40	2
4	short sleeve	white	M	150	3
5	short sleeve	white	L	150	3
6	short sleeve	white	XL	50	3
7	short sleeve	white	S	100	3
8	short sleeve	blue	M	150	3
9	short sleeve	blue	L	150	3
10	short sleeve	blue	XL	50	3
11	short sleeve	blue	5	80	3
12	short sleeve	blue	XS	20	3
13	road	black	39	40	4
14	road	white	39	20	4

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OrderLine

OrderID (PK)	ItemVariantID(PK)	qty
1	1	1
1	4	1
2	13	1
2	9	1
2	3	1

Once everything is ready, we can then move on to generate the database.

Generate database

Now everything is ready, let's generate it into database. To generate database:

1.   Go to **Tools > DB > Generate Database...**
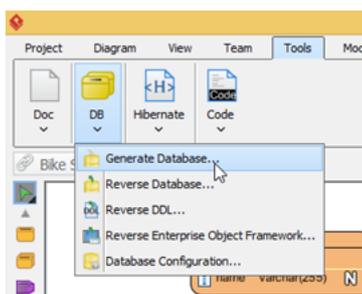
2.   Select **Database only** in **Generate**.
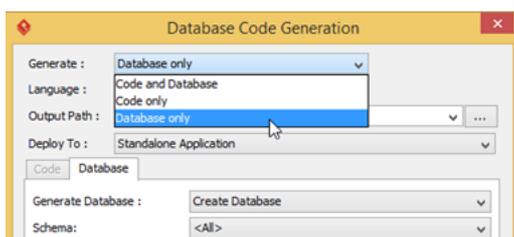
3.   Specify the **Output Path** if you wish to keep the DDL file for your database.

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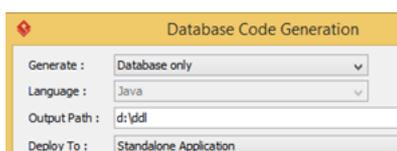
4.   In **Generate Database** field, select **Create Database**.
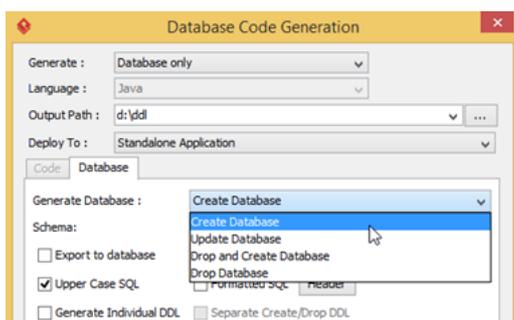
5.   Select **Export to database** to let Visual Paradigm directly execute the DDL script to your database.
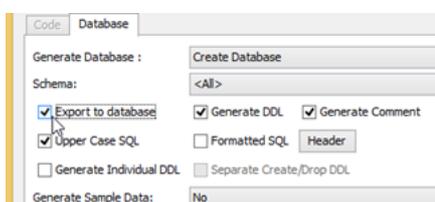
6.   In Generate **Sample Data** field, select **Yes (With Auto Generated PK)**.
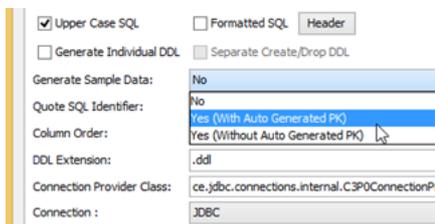
7.   Press **OK** to proceed.

If everything is OK then we will see the progress dialog showing 100% complete.

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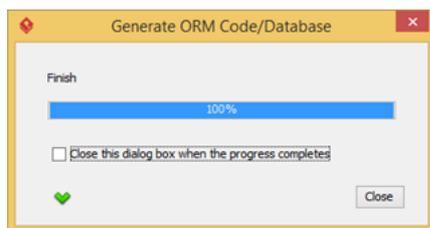
Now let's go to **SQL Server Management Studio** to review our database.
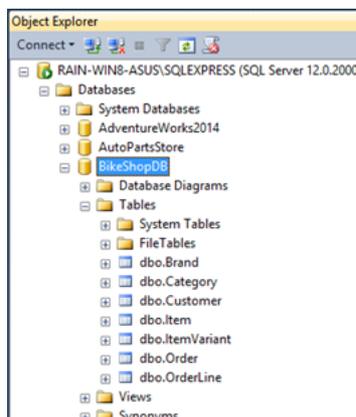
Let's try to see what's inside the *ItemVariant* table. Right-click on it and choose **Select Top 1000 Rows** from popup menu.
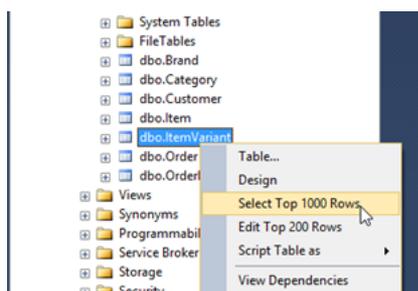
And you can see the sample data are there.

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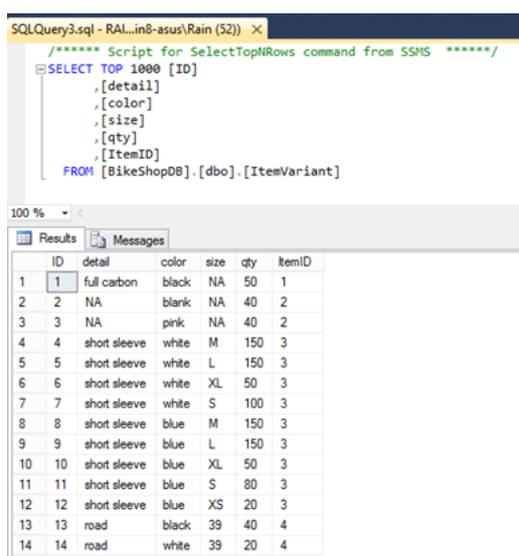
Related Links

- [What is Entity Relationship Diagram (ERD)?](#)

- [How to Produce Database Specification](#)

- [How to Reverse Database Schema into Entity Relationship Diagram without connecting to Database](#)

- [Provide Default Data for Database Design](#)

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