Creating Database Model Diagrams in Microsoft Visio
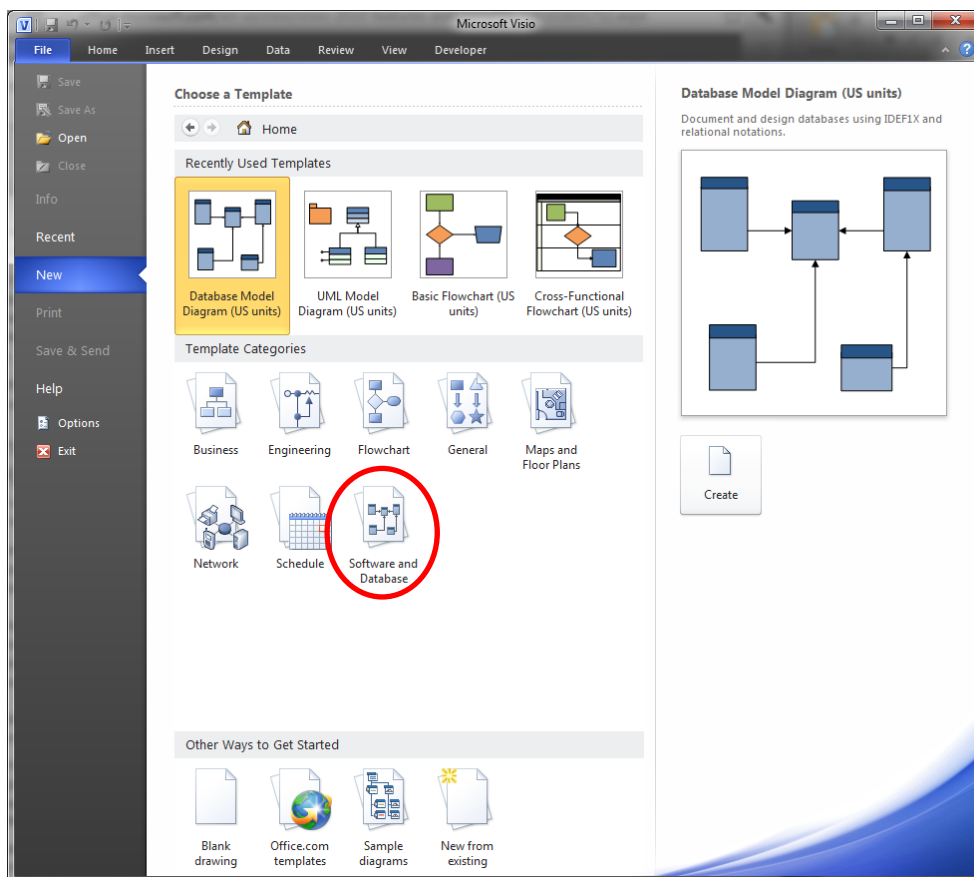## 9-13-2012
Jeffery S. Horsburgh

Visio is a software tool created by Microsoft that contains tools for creating many different types of diagrams. Visio's drawing templates and pre-defined shapes can simplify the creation of a diverse set of diagram types. The following sections provide details for how to create a data model entity-relationship diagram using Visio's Database Model Diagram template.
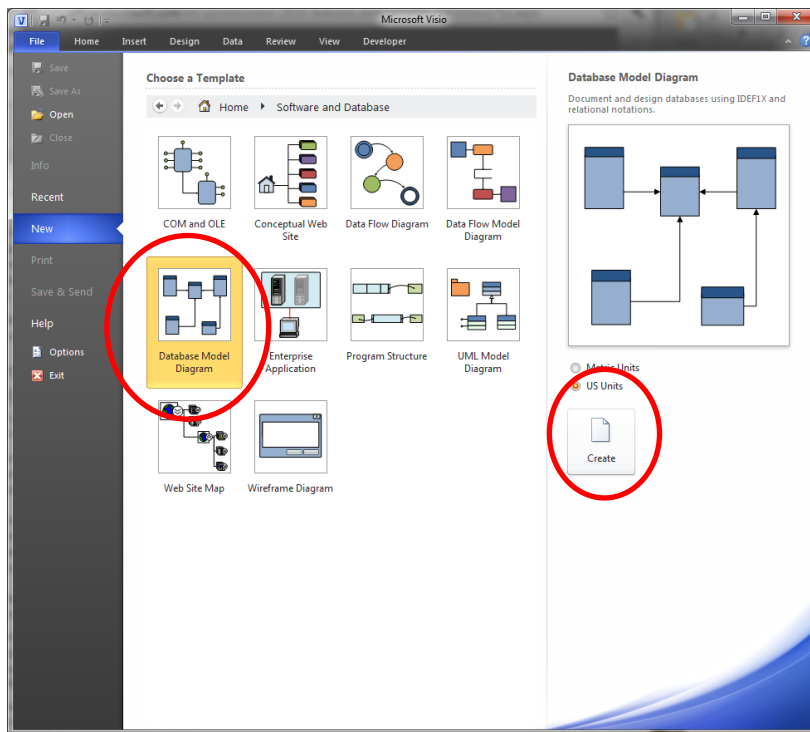
Creating a New Database Model Diagram

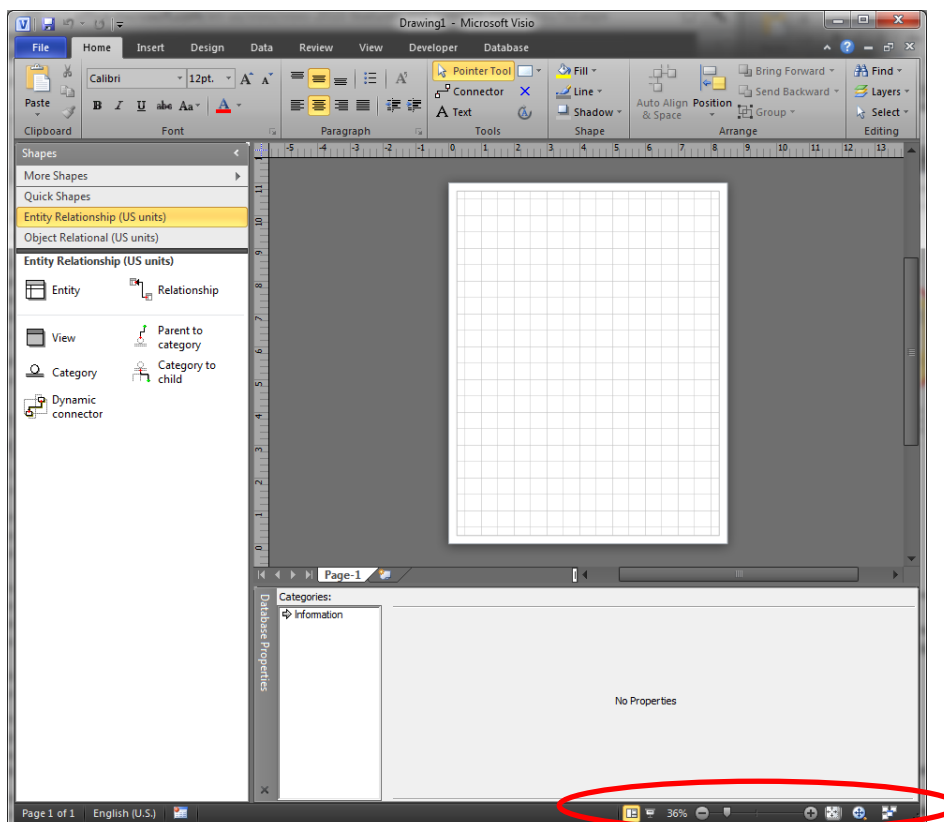Open Visio by clicking Start →All Programs →Microsoft Office → Microsoft Visio 2010.

Visio will open and ask you to choose a template. In the Template Categories, choose "Software and Database."

From the Software and Database template list, choose "Database Model Diagram" and then click the "Create" button.
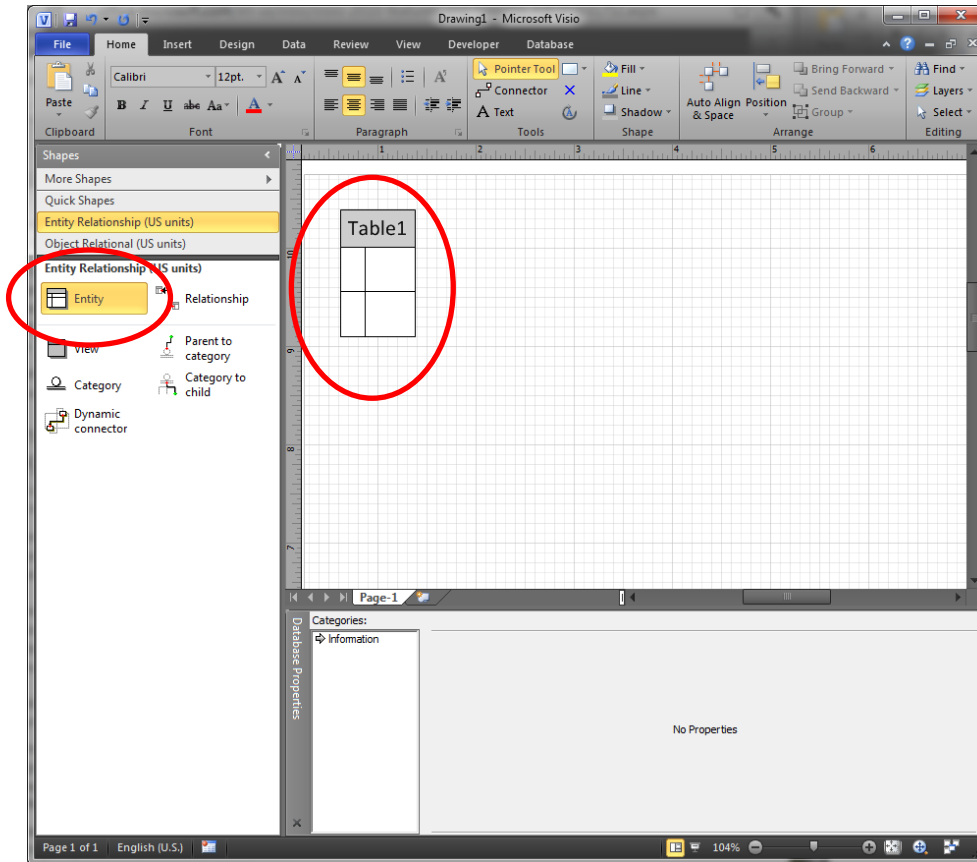
Visio will create a new drawing and will select the types of shapes that are needed for you to create a new entity relationship diagram for your data model. You can zoom in and out on your diagram by using the zoom controls at the bottom of the Visio window.
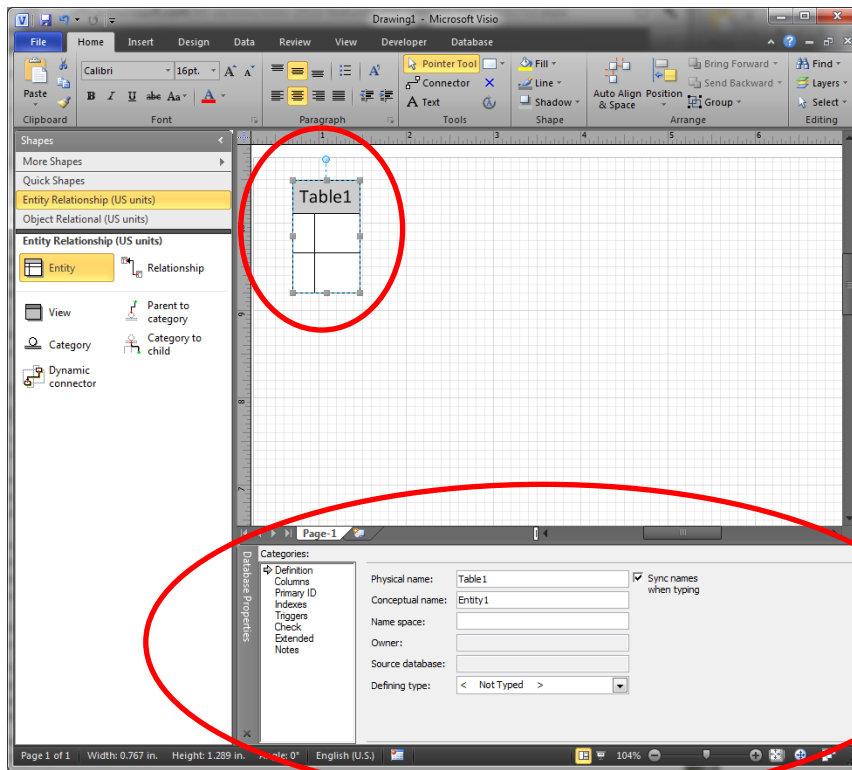
Creating Entities

To create new entities in your drawing, click on the "Entity" shape in the "Shapes" panel on the left and drag a new shape onto the drawing. A new entity called "Table1" will appear on the drawing.
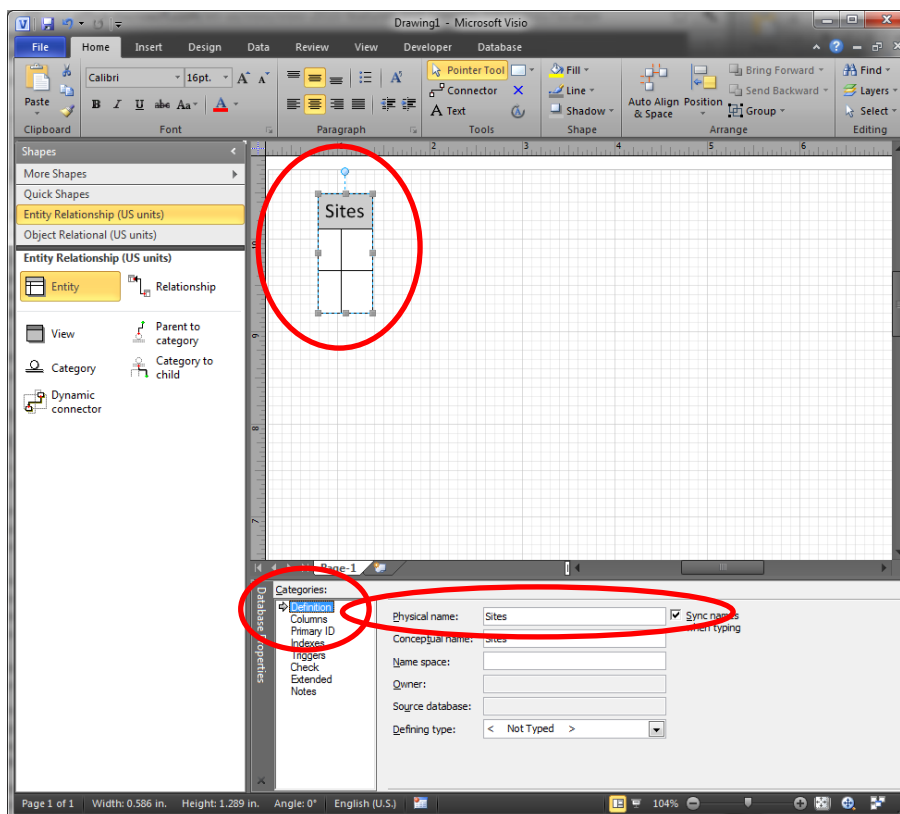

To adjust the location of an entity on your drawing, click on an entity and then drag it to a new location.

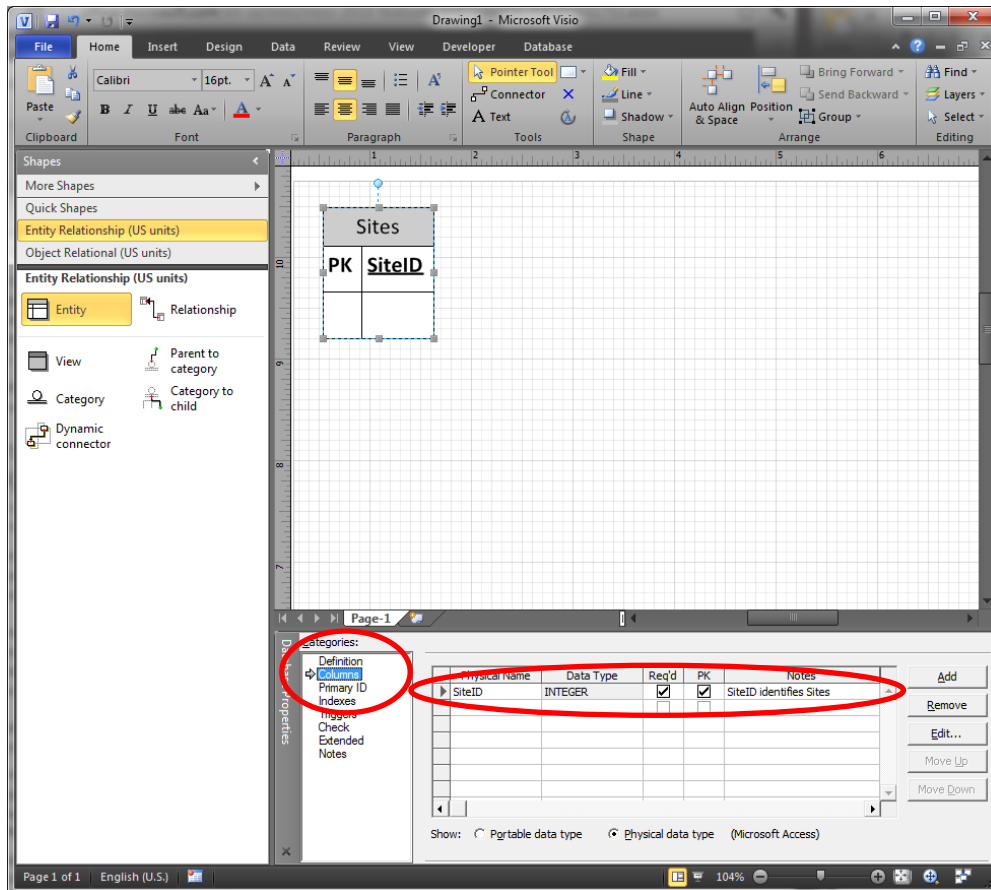**Naming and Adding Attributes to Entities**

When you click on an entity in the drawing you will notice that it becomes selected and the panel at the bottom of the window will reflect the properties of the selected entity.
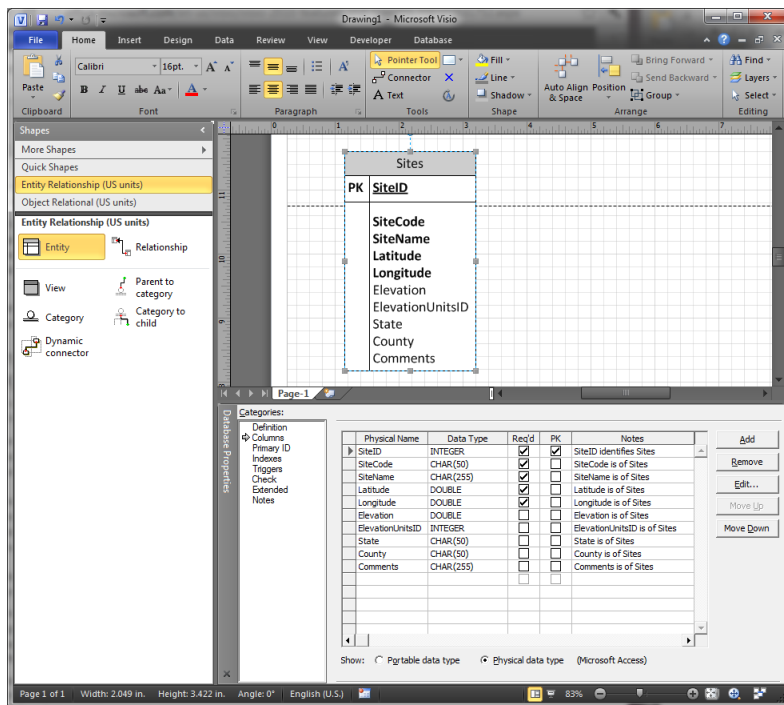
To set the name of an entity, select "Definition" under the list of categories and then type the name of your entity into the "Physical Name" text box.

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To add attributes to your entity, select "Columns" under the list of categories. In the table that appears, click in the "Physical Name" field in the first row and type an attribute name. You can set an appropriate data type in the "Data Type" field and then decide whether that attribute is required to have a value and whether it should be used as the entity's primary key. You can add additional attributes at any time by selecting the shape and then typing an attribute name in the next empty row in the table.
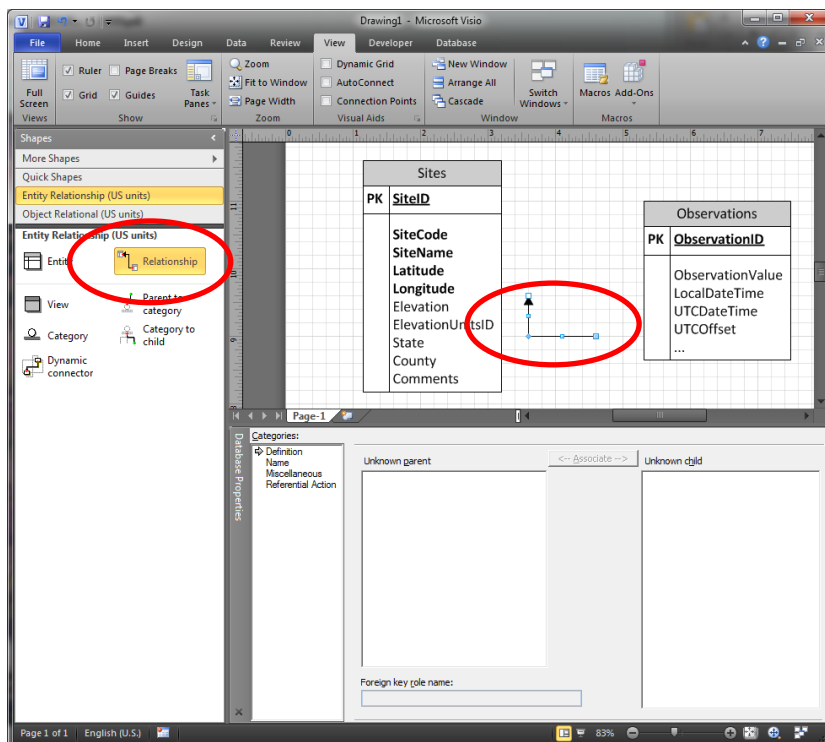

A finished "Site" entity might look like the following. The primary key attribute is designated at the top of the entity and required attributes are shown in bold text.
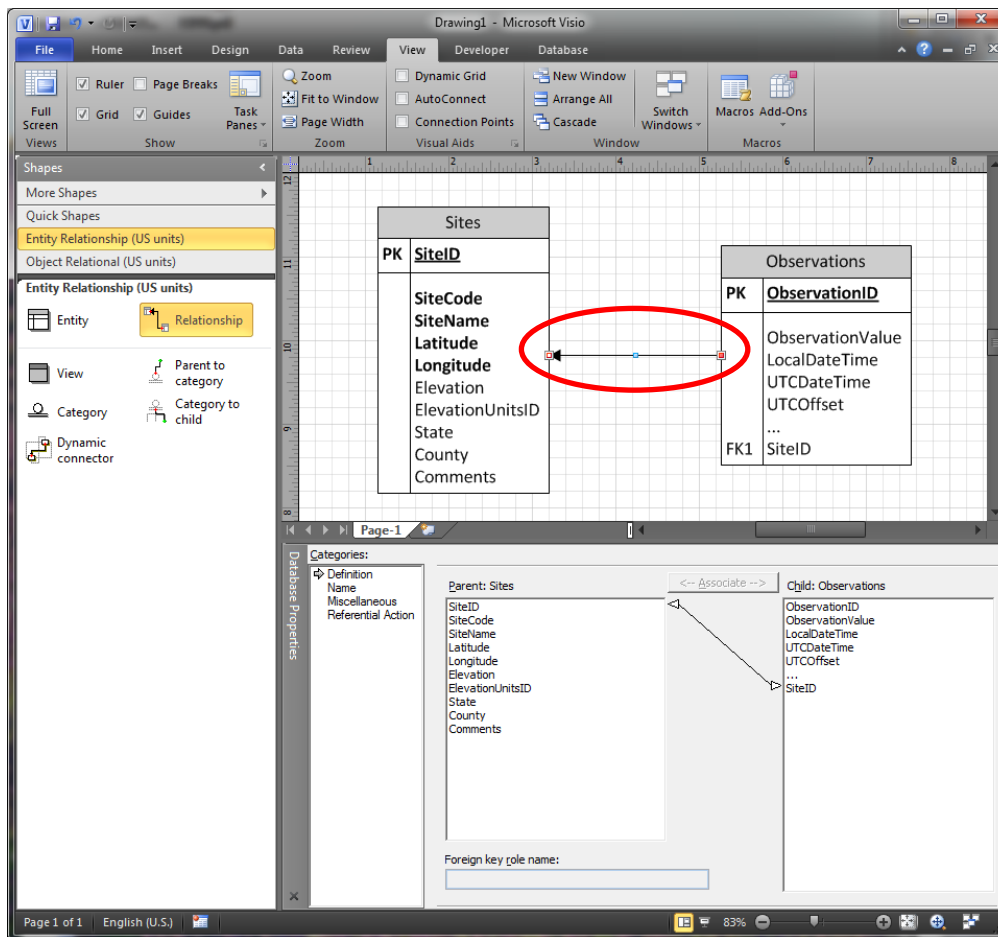
Creating Relationships

Relationships between entities are created by first dragging a relationship from the shapes panel on the left onto the drawing. Then click on the relationship shape to select it, you will notice that there are now selection handles on either end of the shape (the little squares).
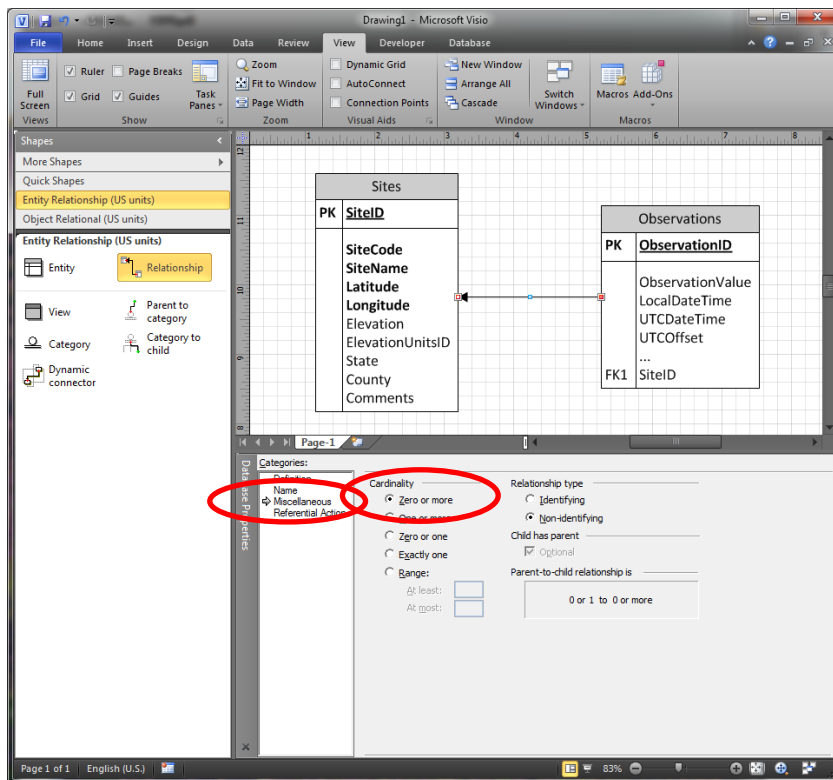
Next, click on the selection handle for the "parent" end of the relationship and drag it over the corresponding "parent" entity. When you drag the end of the relationship over the center of the entity that you want to connect it to, the entity will be outlined in red, at which point you can release your mouse click. That end of the relationship will then be connected to the selected entity. Visio will randomly assign a connection point. Remember that the end of the relationship with the arrowhead should point to the "parent" entity and the other end to the "child" entity. Click the selection handle for the child end of the relationship and drag it to the "child" entity. Your relationship should now be connected to both entities.
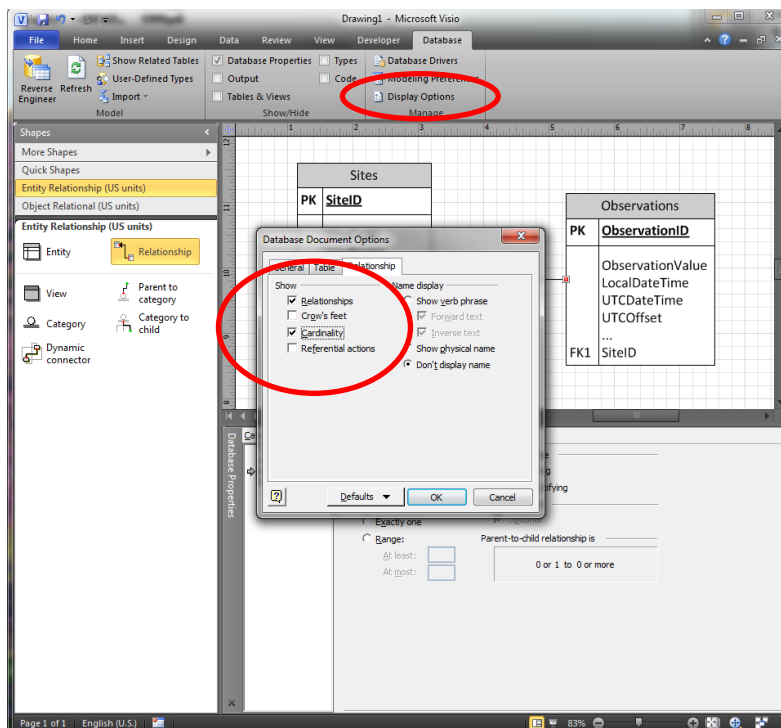

You will notice that when you connected the child end of the relationship to the child entity, the primary key attribute from the parent entity was automatically added to the child entity as a foreign key attribute. You will also notice that in the properties of the relationship at the bottom of the window (under the "Definition" category) Visio is showing which attributes in each entity are participating in the relationship (the "SiteID" attribute in both of the entities in the example above).

Under the "Miscellaneous" category of the relationship properties you can set the cardinality of the relationship. In this particular type of Visio diagram the cardinality options are those for the child entity. In this example, you would be telling Visio how a "site" entity is related to "observations." In this example, the most likely relationship is for one "site" to be related to "Zero or more" "observations."
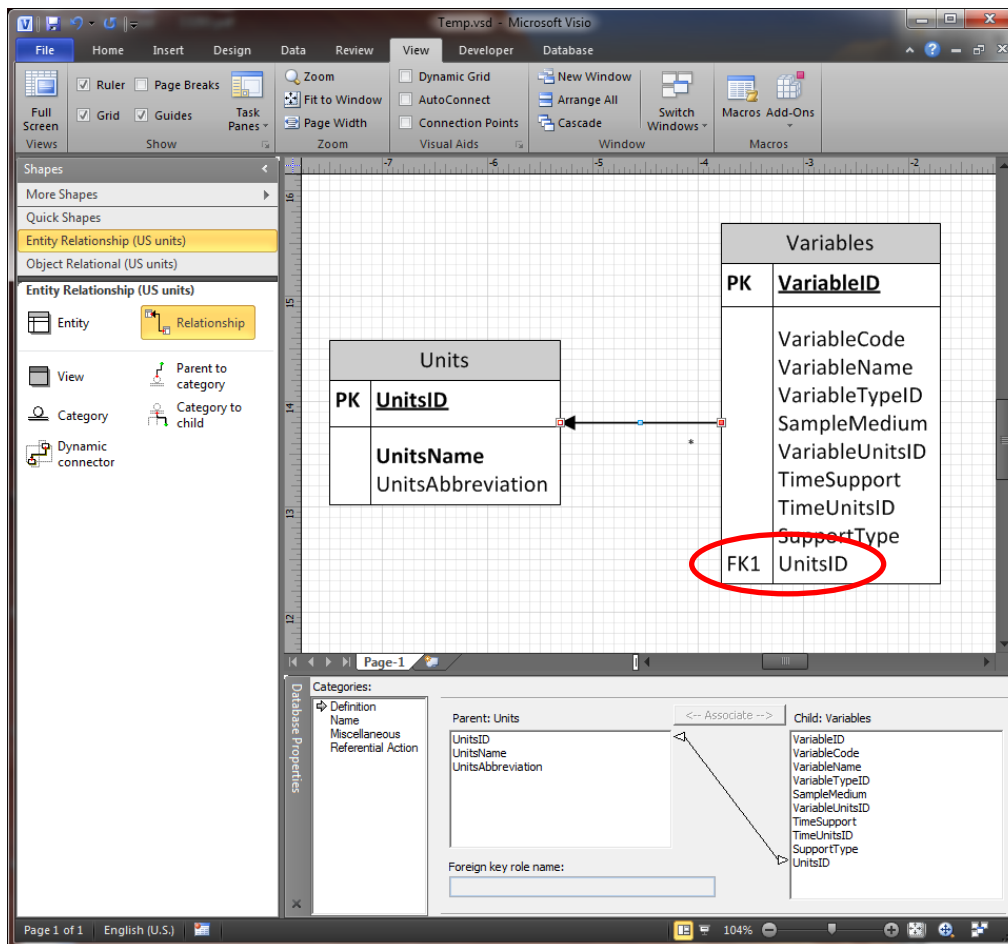
To display the set cardinality on your diagram, select the "Database" tab at the top of the window and then select the "Display Options" button on the ribbon under the "Manage" group. In the window that pops up, make sure "Relationships" and "Cardinality" are selected under the list of objects to show and then click the "OK" button.
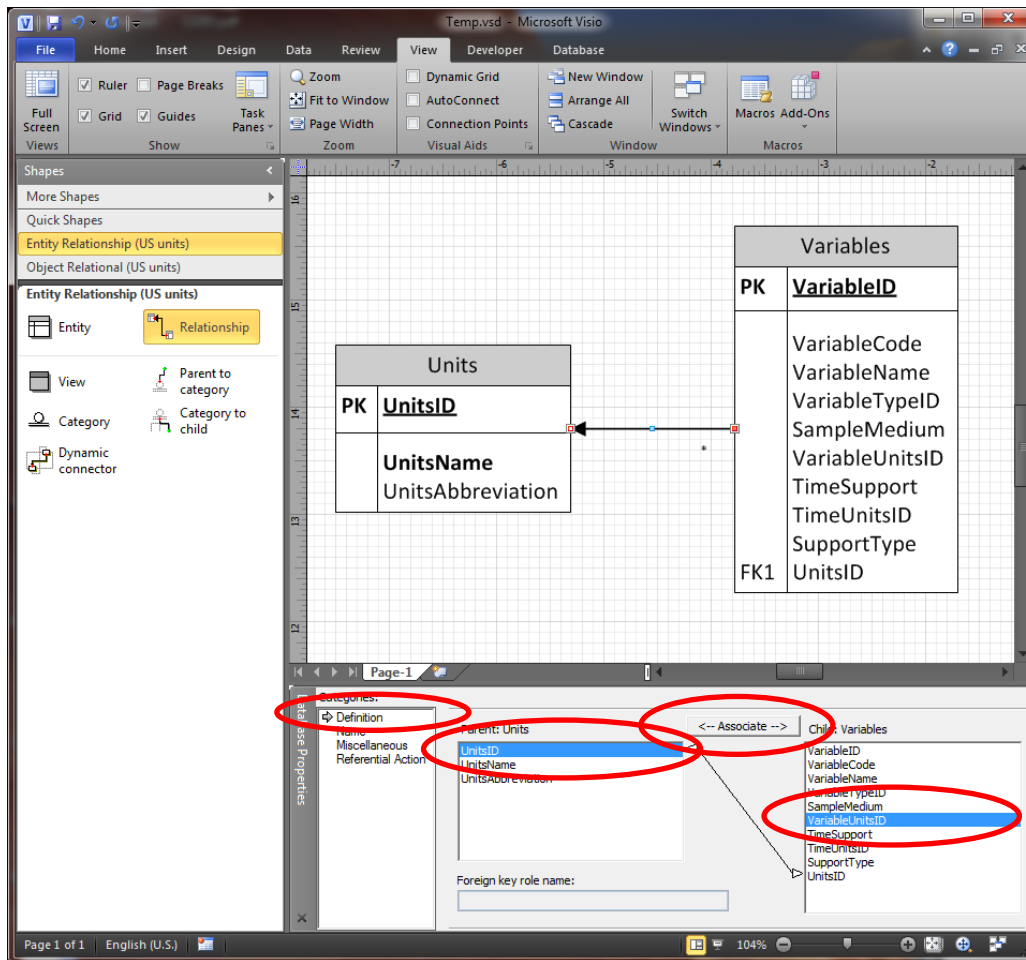
You will notice that the cardinality is now shown for the relationship in your drawing.
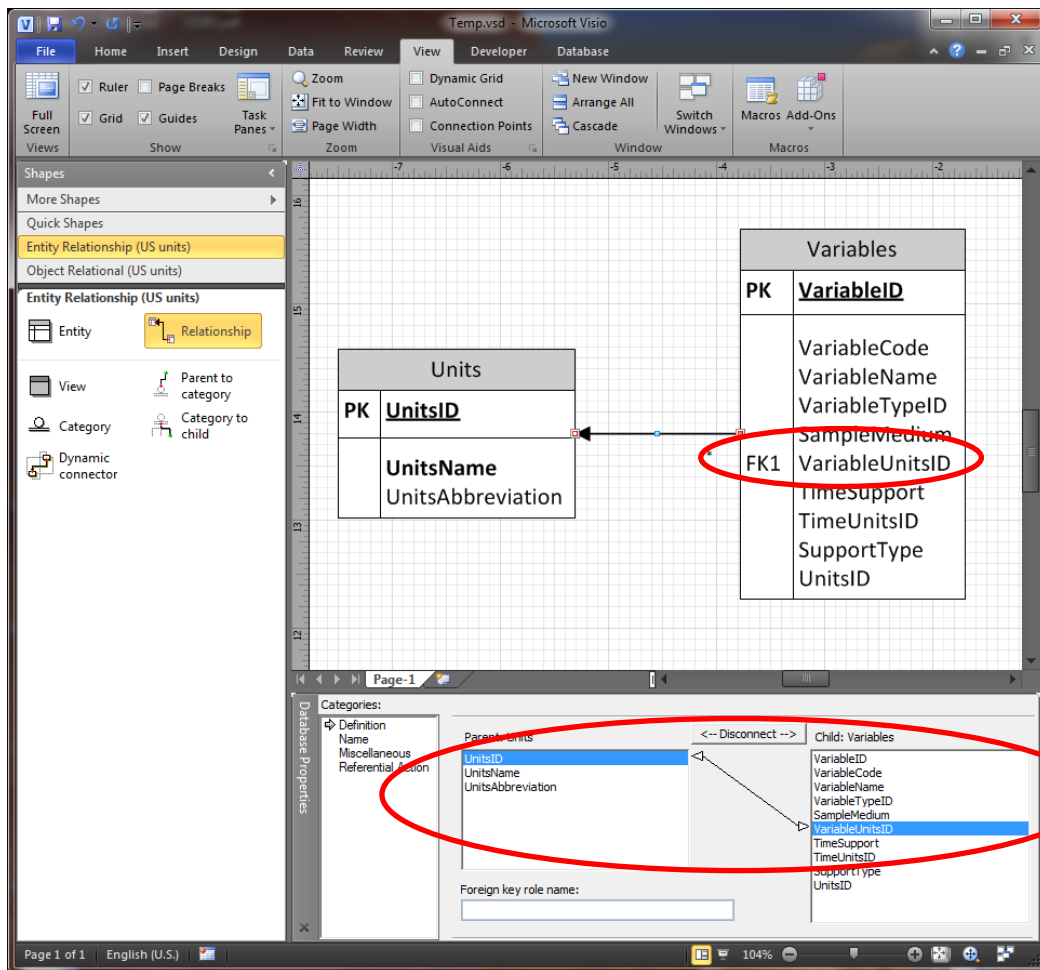
Modifying Relationships

You may find it necessary at some point to modify what Visio creates by default when you add relationships between entities. Or, you may want to be able to create multiple relationships between two entities. For example, you may have defined a "Variables" entity that has attributes called "VariableUnitsID" and "TimeSupportUnitsID" that you want to relate to an entity that defines attributes of Units. This will require two relationships between the two entities. When you add the first relationship between the Units entity and the Variables entity (see the following example), Visio will automatically add an attribute called "UnitsID" to the Variables entity.
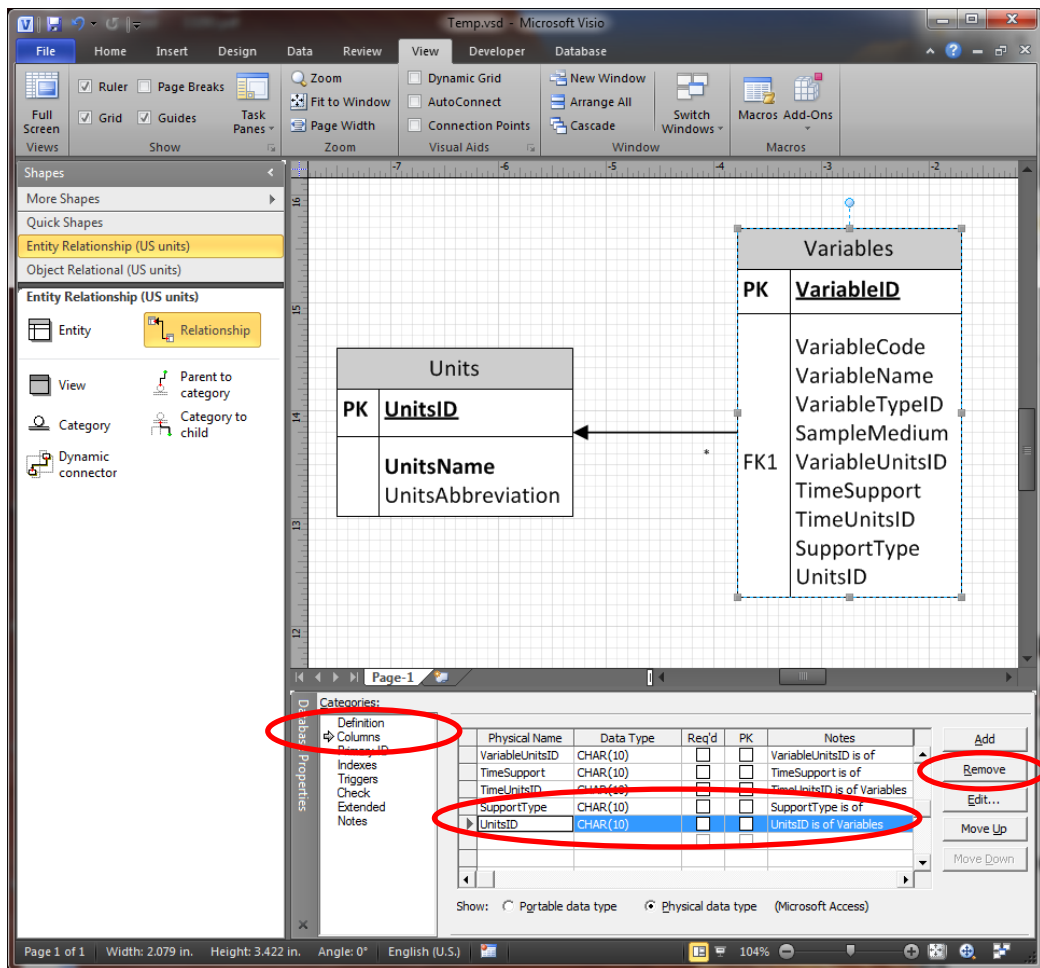

To change the foreign key for the relationship, select the relationship by clicking on it. Then under the "Definition" category of the properties for the relationship, select the primary key from the parent entity by clicking on it (in this example "UnitsID") and the name of the child entity attribute that you want to participate in the relationship instead of the new "UnitsID" attribute that was automatically added (in this example "VariableUnitsID"). Then click the "Associate" button.
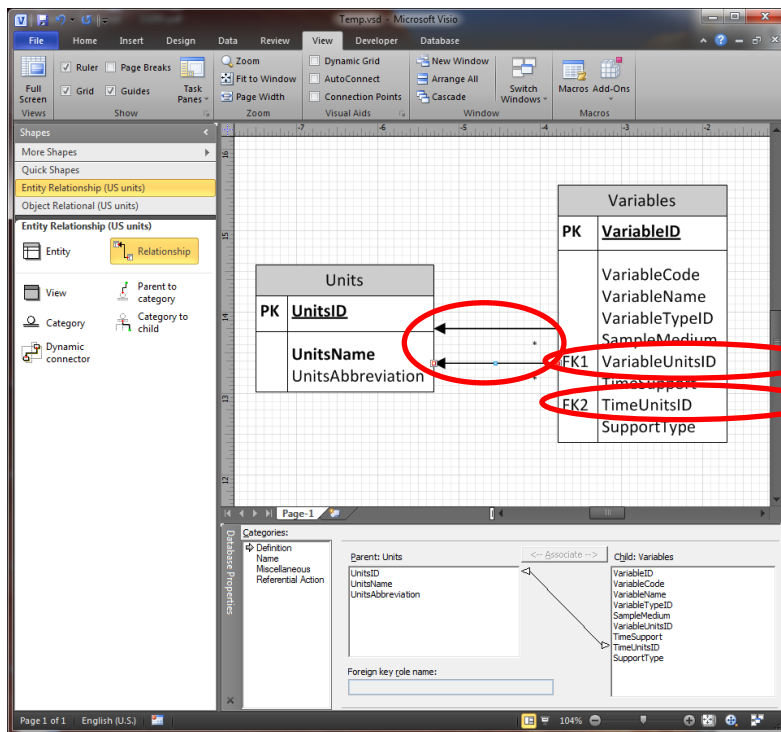
Once you click the "Associate" button you will notice that the relationship has been modified such that the primary key of the parent entity (in this example "UnitsID") has now been connected to the new foreign key in the child entity (in this example "VariableUnitsID") – see below.

The "UnitsID" attribute that was automatically created when you linked the two entities with the relationship can be deleted by selecting the "Variables" entity by clicking on it and in the "Columns" category in the properties of the "Variables" entity select the "UnitsID" attribute and click the "Remove" button.
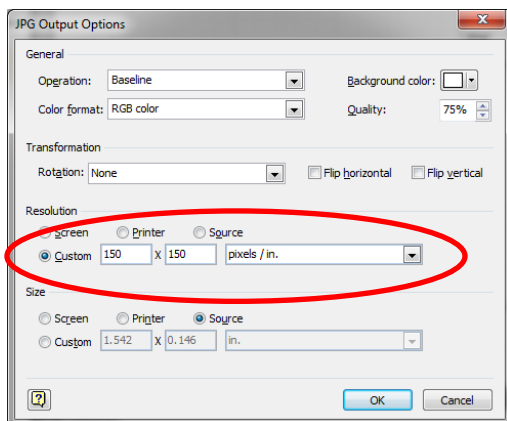
If you need to add an additional relationship between two entities, you can use the process described above. In this example, I also need a relationship between "UnitsID" in the "Units" entity and "TimeUnitsID" in the "Variables" entity. The result looks like the following:

Exporting the Diagram

When you finish your drawing, you will want to export it as an image so you can paste it into a Word document as an appendix. At the top of the Visio window, click the "File" tab and then choose "Save As" in the list on the left panel of the window. In the "Save As" dialog that comes up, choose where you want to save the file, give it a name, and select a format for your exported drawing. JPEG files generally work well for pasting into documents as figures, so choose "JPEG File Interchange Format" from the "Save as type" drop down control. Then click "Save." The following window will pop up:

You will want to make sure that you export the image with enough resolution that it is not blurry when you print it. For most purposes a "Custom" resolution of 150 X 150 pixels per inch will work great. When you have set the resolution click the "OK" button to generate the image. You can then insert the image into a Word document.

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