

Bridge Fragility Mapping

Overview

This page will build on the example that is presented in the [Bridge Fragility](#) page. Now that we have a bridge fragility curve, we need to tell MAEViz how to map bridge fragilities to bridges. What we will learn in this section is:

- How to create a bridge fragility mapping file
- How to ingest a bridge fragility mapping file

Create Fragility Mapping

This section will require a very basic understanding of XML and is something that we can help the user with putting together if you contact us by email. The basic concept behind the fragility mapping is to tell MAEViz which bridge fragilities should be used with which bridges. The mapping file allows you to use a specific set of rules to map fragilities to buildings (e.g. if a bridge has a classification of type MSC_Concrete use fragility curve with ID 1). The more bridge attributes you have in your bridge dataset, the more complex mapping you can make. For our case, we will keep this simple and only use the bridge class attribute in our mapping.

Using the example below, we'll go through the various parts of the fragility mapping.

```
<match-filter-map>
  <property-match>
    <success-value>
      <map>
        <entry key="Non-Retrofit Fragility ID Code" value="1"/>
        <entry key="Restrainer Cables Retrofit Fragility ID Code" value="" />
        <entry key="Shear Key Retrofit Fragility ID Code" value="" />
        <entry key="Steel Jacket Retrofit Fragility ID Code" value="" />
        <entry key="Elastomeric Bearing Retrofit Fragility ID Code" value="" />
        <entry key="Seat Extender Retrofit Fragility ID Code" value="" />
      </map>
    </success-value>
  </property-match>
  <filter>
    <statement>
      <rule>String class EQUALS MSC_Concrete</rule>
    </statement>
  </filter>
</match-filter-map>
```

Between the `<map>` `</map>` tags is where the fragility identifiers are specified. Where it says key is for MAEViz internal use and that must match exactly because the "Non-Retrofit Fragility ID Code" tells MAEViz this is the as-built fragility for the bridge. The second part where it says value is a fragility ID in your fragility dataset (e.g. 1), this must match a fragility in your fragility dataset.

In the next section of the example above you will see `<rule>` `</rule>` tags between `<statement>` `</statement>` tags. These are the rules to determine if the fragility with ID of 1 should be used for a particular bridge. If you look at the first rule where it says:

```
<rule>String class EQUALS MSC_Concrete</rule>
```

there are four parts: *data type*, *field name*, *inequality* and *field value*. In this case, *String* is the data type, *class* is the field name we are looking for in the bridge dataset, *EQUALS* is the inequality, and the field value is *MSC_Concrete*. For each bridge, MAEViz will retrieve the value in the *class* column and see if it exactly matches *MSC_Concrete*. If it does, then MAEViz will attempt to retrieve the fragility with ID 1 and apply it to the bridge. We could include more rules by adding additional `<rule>` `</rule>` tags. For example, we could also specify that a bridge must have a certain number of spans to use this particular fragility. The rules are treated as *AND* statements so if any fail, MAEViz will move to the next `<property-match>` `</property-match>` tags that contain the next fragility curve and its rules to see if it has a match. If MAEViz fails to find a match, then it will skip the damage estimate for that bridge.

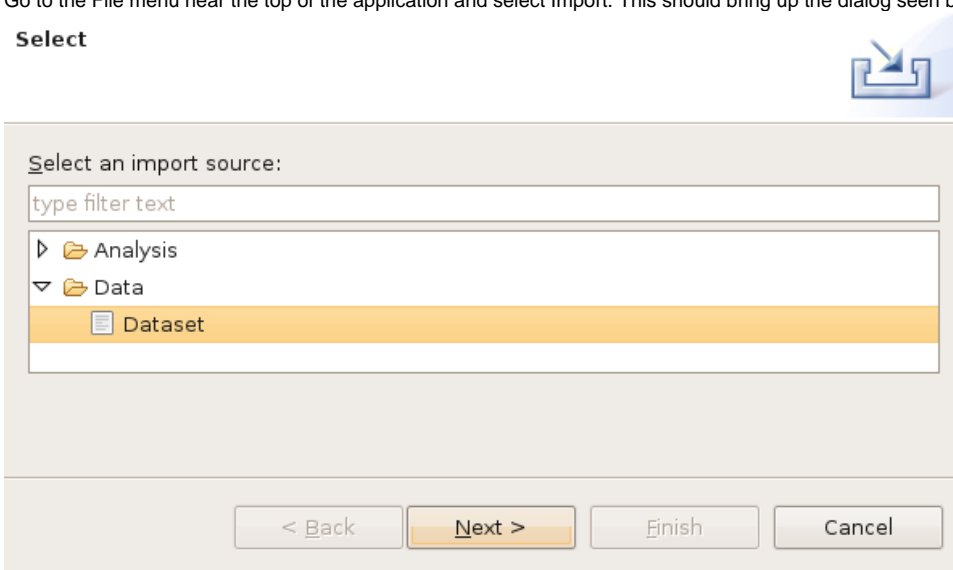
If you need to create a fragility mapping file that maps your fragilities to your bridge dataset, an expert will need to prepare a list of rules that maps a fragility to each bridge and save the rules in an XML file. After creating the file, you need to ingest it into MAEViz. Ingesting data into MAEViz will be detailed in the next sections. The mapping file above can be downloaded [here](#).

Ingest Fragility Mapping

After downloading the bridge fragility mapping file, follow the steps below to ingest it into MAEViz:

1. Go to the File menu near the top of the application and select Import. This should bring up the dialog seen below.

Select

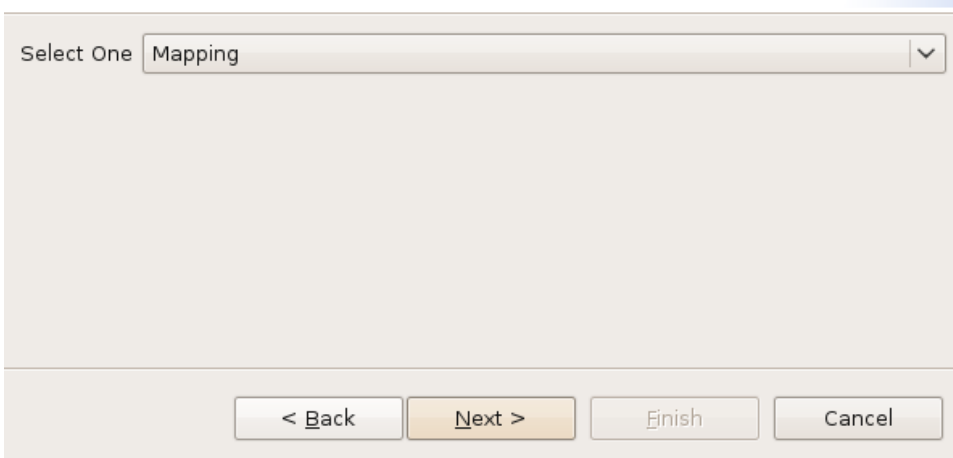


The dialog box has a title bar with a blue icon of a document with a downward arrow. Below the title bar is a section titled "Select an import source:" with a text input field containing "type filter text". Below this is a tree view with two folders: "Analysis" and "Data". The "Data" folder is expanded, showing a sub-item "Dataset" which is highlighted in orange. At the bottom of the dialog are four buttons: "< Back", "Next >", "Finish", and "Cancel".

2. From the dialog box, expand the Data selection and select Dataset and click Next. You should see something similar to the image below.

Select file type

Please select the type of file to import

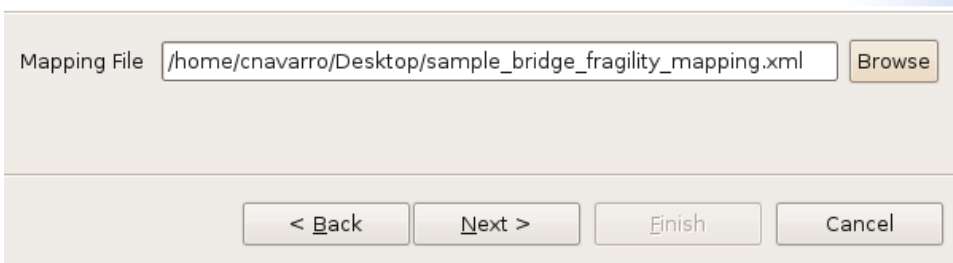


The dialog box has a title bar. Below the title bar is a section titled "Select file type" with a text input field containing "Please select the type of file to import". Below this is a dropdown menu with the text "Select One" and "Mapping" selected. At the bottom of the dialog are four buttons: "< Back", "Next >", "Finish", and "Cancel".

3. From the dialog drop down menu, select Mapping and click Next. You should see a dialog similar to the one in the image below.

Ingest a Mapping File

Please enter the path to the mapping file

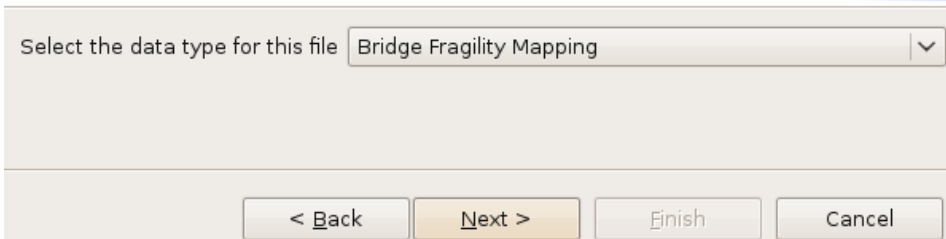


The dialog box has a title bar. Below the title bar is a section titled "Ingest a Mapping File" with a text input field containing "Please enter the path to the mapping file". Below this is a text input field with the path "/home/cnavarro/Desktop/sample_bridge_fragility_mapping.xml" and a "Browse" button. At the bottom of the dialog are four buttons: "< Back", "Next >", "Finish", and "Cancel".

- From the dialog, click the Browse button and select the bridge fragility mapping you want to ingest and click the Next button. You should see a dialog similar to the one below.

Select data type

Please select the type of data for this file



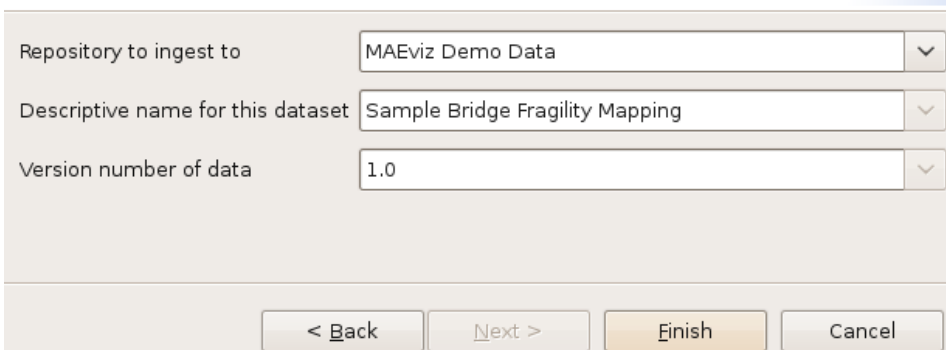
Select the data type for this file Bridge Fragility Mapping

< Back Next > Finish Cancel

- From the dialog drop down menu, select *Bridge Fragility Mapping* and click Next. You should see a dialog similar to the one below.

Descriptive Data

Please enter the following descriptive information



Repository to ingest to MAEviz Demo Data

Descriptive name for this dataset Sample Bridge Fragility Mapping

Version number of data 1.0

< Back Next > Finish Cancel

- From this dialog you can select the repository to ingest the dataset to, provide a descriptive name for the dataset (e.g. Sample Bridge Fragility Mapping), and a version number (e.g. 1.0). After entering the required information, click the Finish button.