NetXML 2.1 Documentation

Benjamin Elbirt

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I NetXML 2.1 Product Specification

I Product Overview

NetXML 2.1 © is an application written in Java that translates networks with varying attributes and relations to XML files. These XML files can be used with any XML ready application and the DTD defined in this document.

This application is specifically designed for XML generation to be used with Jacob's Ladder 12.1 or later and does not follow any agreed upon XML specification at this time.

II Software Installation

NetXML 2.1 © requires the installation of the latest Java environment which is available at http://www.java.com/en/download/index.jsp.

The file *netXML.jar*, which represents the **NetXML 2.1 ©** executable Java application, should be installed in the *C:\program files\ElbirtSoftware* directory as this is a common directory for DLL and related files used by software created by Benjamin Elbirt.

At this time the **NetXML 2.1 ©** software has not been tested outside of a Windows XP / Vista environment.

III Memory Expansion and Consumption

NetXML 2.1 © uses as much memory as made available through the Java environment and the command line execution. To increase the memory, use:

*java –jar –Xms **1M** –Xmx **2M** netXML.jar*

where ***1M*** is the amount of memory to use for the initial heap size and ***2M*** is the amount of memory to use for the maximum heap size. The **M** is used to represent megabytes.

java –jar –Xms 1000M –Xmx 2000M netXML.jar

will launch the application with an initial heap of 1 GB and a maximum heap of 2 GB.

IV Bug Collection & Reporting

Use the "java –jar netXML.jar" command from a prompt (DOS/Unix/Mac) to obtain error messages from the executable. Please report any bugs / problems to the author, Benjamin Elbirt, at sarq_6669@yahoo.com.

V Release Update List

1. Version 2.1 – Fixed bug with the "Load" option that was not allowing matrixes to be loaded as new (9/2009).

VI Future Enhancements

The following enhancements are planned for future releases:

1. GraphML Input/Output
2. UCINet Input/Output
3. MultiNET Input/Output
4. Pajek Inputs
5. Rotation Algorithm Repairs

II NetXML 2.1 Interface

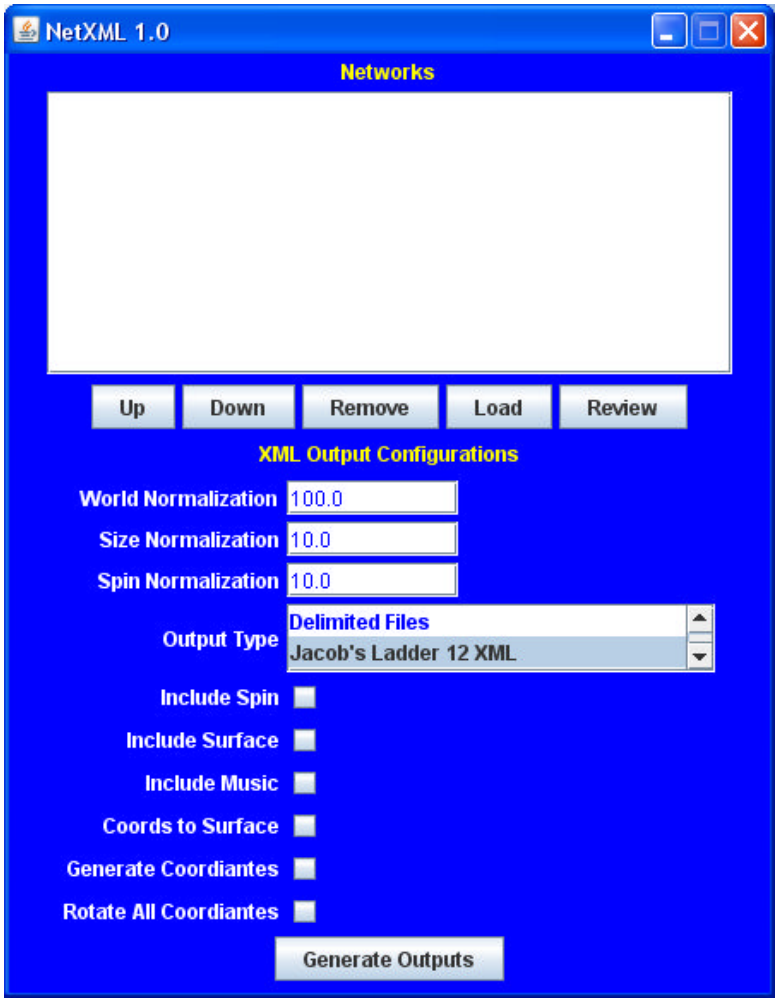


Diagram 1 – NetXML 2.1© Interface

The **NetXML 2.1** © interface is a single window with input and output options. This software does not provide features for modification of the network data as the previous version did. All modifications must occur external to **NetXML**. An option is provided to review the data stored in memory for processing.

I. Networks and Control Buttons

Networks

This is the window that contains the ordered list of all networks currently stored in memory for eventual output to XML.

Up, Down

These buttons will move the matrixes selected for ordering. Ordering is necessary for rotation and proper animation sequencing.

Remove

This button will remove the selected matrixes.

Load

This button initiates the load sequence. An initial "what do you want to load" option window is provided with the following options:

- **Edge Color Matrix**
  This option is new to **NetXML 2.1** and allows for the specification of hard colors for edges. Each file should contain the same matrix specification for the connection matrix; however the data provided should be a color code. **-1** should be used for non-present values; **0.0** is considered "black." Specification is done separately for each color code (R, G and B).

- **Data List**
  This option is new to **NetXML 2.1** and allows for the specification of multiple files to load. Please see the Data List Specification for more details.

- **Matrix**
  The matrix option is used to load an edge matrix from a Microsoft Excel 97 file or delimited UTF8/ASCII text file. Delimiter types can be one of tab, comma, space or pipe and relation types can be one of strength or distance.

  Values provided in the matrix must be positive floating point numbers greater than or equal to zero (v >= 0.0).

  The matrix loaded will be added to the matrix list unless a matrix in the existing list is selected prior to loading the edge matrix. The edge relations will be applied to the existing matrix selected.

- **Relations**
  This option allows for the importation of relational matrixes to be applied to existing matrixes (vs. loading new matrixes using the Matrix option). Options are the same (delimiter / input file type).

- **JL-11 Excel File**
  This option allows for the importation of Jacob's Ladder 11© Microsoft Excel 97 files. The option to include or exclude any matrix spreadsheet within the file is provided as the file is loaded.

- **JL-12 XML File**
  This option will load a Jacob's Ladder 12© XML file (generated by this program).

- **Attributes**
  This option will load an attribute file to apply to a new network or the network

selected from the Network List pane. The attribute file can be a Microsoft Excel 97 file or delimited UTF8/ASCII text file. Delimiter types can be one of tab, comma, space or pipe. All attributes should have a header name in the first row and the name must be one of *label, size, spin, hidden, note, channel, crdX, crdY, crdZ, colorR, colorG, colorB, velocity, ScrdX, ScrdY, ScrdZ, instrument,* or *shape.* **The header name MUST be one of the ones listed (case sensitive) or it will be ignored.**

- **Link Pairs**
  This option will load a link-pairs network file (used for large/sparse networks). The file type is assumed to be UTF8/ASCII compatible with one of tab, comma, space or pipe delimitation. An option is provided to specify the relation type (strength or distance) followed by the option to use Binary values for missing data (assume 1.0 for any pair without a value provided). Finally, an option to assume symmetry for the relation list is provided.

  The link pair file should contain, one on each row, a delimited list of:
  id1<DELIM>id2<DELIM>link strength

  where *id1* and *id2* are integer ID numbers for the network nodes (id >= 1) and the *link strength* is a positive floating point relation value. Link strengths can be missing if the "binary values for missing data" option is used.

Review

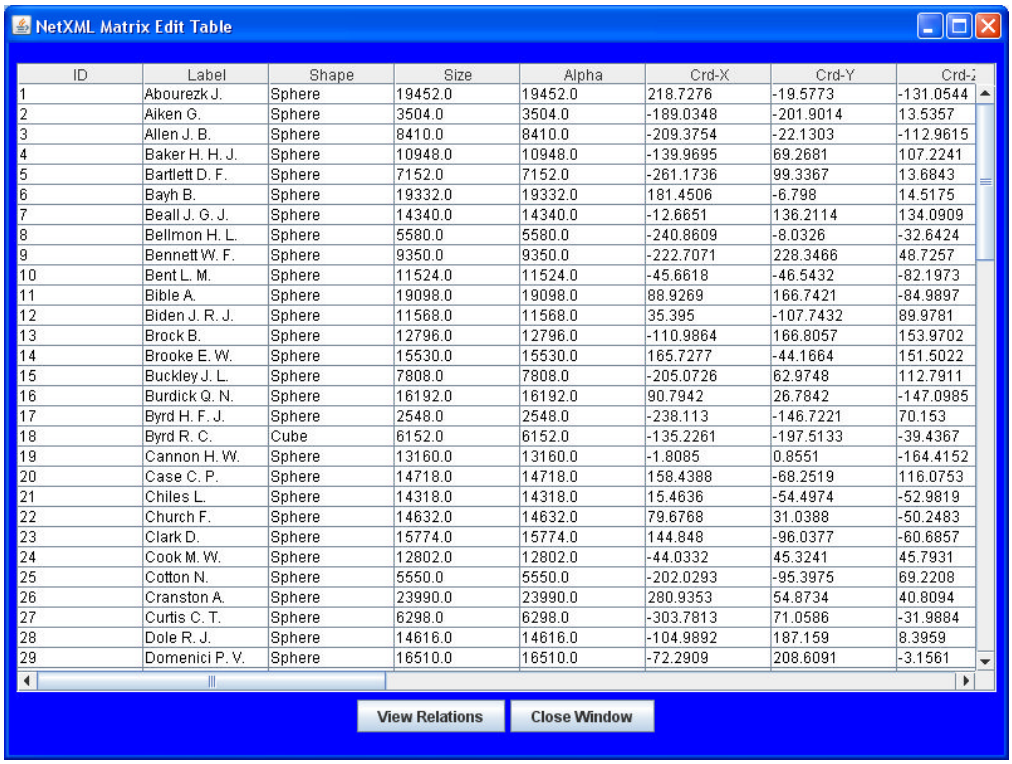
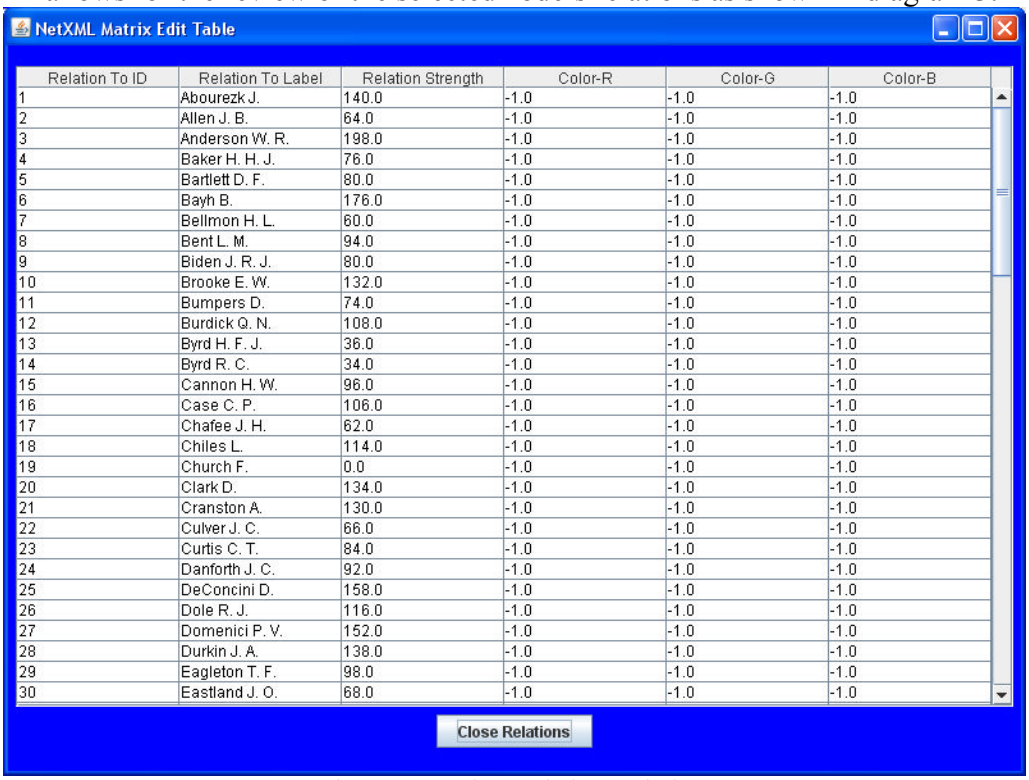


Diagram 2 – NetXML 2.1 Review Panel

The *Review* button will provide a new window with the matrix data for the selected matrix to review. A *View Relations* button provided in this window allows for the review of the selected node's relations as shown in diagram 3.



Relation To ID	Relation To Label	Relation Strength	Color-R	Color-G	Color-B
1	Abourezk J.	140.0	-1.0	-1.0	-1.0
2	Allen J. B.	64.0	-1.0	-1.0	-1.0
3	Anderson W. R.	198.0	-1.0	-1.0	-1.0
4	Baker H. H. J.	76.0	-1.0	-1.0	-1.0
5	Bartlett D. F.	80.0	-1.0	-1.0	-1.0
6	Bayh B.	176.0	-1.0	-1.0	-1.0
7	Bellmon H. L.	60.0	-1.0	-1.0	-1.0
8	Bent L. M.	94.0	-1.0	-1.0	-1.0
9	Biden J. R. J.	80.0	-1.0	-1.0	-1.0
10	Brooke E. W.	132.0	-1.0	-1.0	-1.0
11	Bumpers D.	74.0	-1.0	-1.0	-1.0
12	Burdick Q. N.	108.0	-1.0	-1.0	-1.0
13	Byrd H. F. J.	36.0	-1.0	-1.0	-1.0
14	Byrd R. C.	34.0	-1.0	-1.0	-1.0
15	Cannon H. W.	96.0	-1.0	-1.0	-1.0
16	Case C. P.	106.0	-1.0	-1.0	-1.0
17	Chafee J. H.	62.0	-1.0	-1.0	-1.0
18	Chiles L.	114.0	-1.0	-1.0	-1.0
19	Church F.	0.0	-1.0	-1.0	-1.0
20	Clark D.	134.0	-1.0	-1.0	-1.0
21	Cranston A.	130.0	-1.0	-1.0	-1.0
22	Culver J. C.	66.0	-1.0	-1.0	-1.0
23	Curtis C. T.	84.0	-1.0	-1.0	-1.0
24	Danforth J. C.	92.0	-1.0	-1.0	-1.0
25	DeConcini D.	158.0	-1.0	-1.0	-1.0
26	Dole R. J.	116.0	-1.0	-1.0	-1.0
27	Domenici P. V.	152.0	-1.0	-1.0	-1.0
28	Durkin J. A.	138.0	-1.0	-1.0	-1.0
29	Eagleton T. F.	98.0	-1.0	-1.0	-1.0
30	Eastland J. O.	68.0	-1.0	-1.0	-1.0

Diagram 3 – View Relations Window

II. Output Configurations

The Output Configurations panel provides input options for data normalization and a series of output related checkboxes.

General Normalizations

Specific values are normalized without providing user controls. Colors are all normalized to values between 0.0 and 1.0. Relations are normalized to values between 0.0 and 7.0 as the largest line possible with OpenGL / JL12.1© is 7.0. Notes and Velocities are normalized to values between 0 and 127. Surface coordinates are normalized to -1.0 <= x <= 1.0 for proper surface display.

World Normalization

World normalization alters the coordinate system to fit within a system of the given world normalization sized. World normalization must be a floating point value greater than zero (norm > 0.0).

Size Normalization

Size normalization is a floating point value greater than zero (size > 0.0) used for object size displayed in the JL12© window. Findings indicate a size 1/10 of the world normalization size is a good starting point for visualization.

Spin Normalization

This normalization value must be a floating point greater than zero (spin > 0.0) and is used to normalize all spin data to a maximum spin rate. This spin rate is the number of rotations to occur between 2 points in time and is only applicable toward animation JL types.

Output Type

NetXML 2.1 provides additional outputs from the JL-12 XML. Options now include tab delimited text files, Pajek data files, NetTunes sound files and MS Excel 97 files.

Delimited files are generated for each matrix with the specific content in the name. All files are tab delimited.

Pajek files contain the node and edge configurations as expected by the Pajek software. Colors are applied such that any non-zero value will result in the color combination of binary value. For example, RGB 1, 0.5, 0 will result in Yellow (1, 1, 0). All possible combinations are used to output color names accepted by Pajek.

MS Excel 97 files will be generated, one for each matrix, with the matrix specific data provided in multiple spreadsheets.

NetTunes sound files are readable/usable by the NetTunes software.

Include Spin

Select this option to include spin values in the XML output.

Include Surface

Select this option to include surface coordinates for the JL-12.1 surface display feature.

Include Music

Select this option to include note, velocity, channel and instrument values in the XML output.

Coordinates to Surface

Select this option to use the existing coordinate system (crdX, crdY, crdZ) for the surface coordinates pre-normalization.

Generate Coordinates

Select this option to generate coordinates for all data sets that contain relations.

Rotate All Coordinates

Select this option to rotate all coordinate systems for increased accuracy of display. This is especially important when using the generate coordinates option as coordinates generated are not dependent on previous coordinate systems and the results may be rotated/flipped from those of a previous network set. This algorithm will attempt to match a given coordinate system to the previous system in the network sequence; i.e. reduce the differences until the closest match can be found.

WARNING: The rotation algorithm is not functioning properly and does not execute at this time.

III NetXML 2.1 DTD

```
<?xml version="2.1" encoding="UTF-8"?>
<JL12 type="" size="">
      <MATRIX name="" id="" symmetrical="" binary="">
            <NODE id="" label="" size="" sizealpha="" shape=""
            spin="" colorR="" colorG="" colorB="" crdX="" crdY=""
            crdZ="" ScrdX="" ScrdY="" sCrdZ="" note="" instrument=""
            channel="" velocity="">
                  <RELATION id="" strength="" colorR="" colorG=""
                  colorB=""></RELATION>
            </NODE>
      </MATRIX>
</JL12>
```

XML Elements Explained

<MATRIX>

This element contains the matrix name, unique id number and a true/false statement about the symmetrical and binary status of the matrix. The id number is used in ordering.

All nodes are contained within the Matrix element.

<NODE>

This element contains node attributes including the id, label, size, sizealpha, shape, spin, color R,G,B, coordinates X,Y,Z, surface coordinates X,Y,Z and the music note, instrument, channel and velocity.

All relations related to the node are contained within the Node element.

<RELATION>

This element contains the relation information for the given node. The *id* specified is the id of the node relating to and the *strength* is the value of the relation. *colorR*, *colorG*, and *colorB* are for forced edge color attributes.

IV Data List Specification

The data list provides a single input method for adding a large volume of data to the Network List. Tab, comma and pipe delimited input options are available for the data list. Each line of the file should contain the definitions for one matrix as follows:

```
datatype|dataname|datafilepath|datadelim|mxtype
```

datatype is the type of data input and can be one of (case sensitive): *Matrix-Delim, Matrix-Excel, JL-12 XML File, JL-11 Excel File, Link Pairs.*

dataname is the name to associate with the data when shown in the **NetXML** Network List.

datafilepath is the file name/location (ex. C:\temp\somefile.txt) to load.

datadelim is the delimiter (*Pipe, Comma, Space, Tab*) that will be used for the **datatype**. This information is ignored for Excel input file types.

mxtype is the type of matrix and can be one of *Strength* or *Distance*.

Attribute data can be specified by adding the following to the specification after the **mxtype** element:

```
|attributetype|attirbutepath|delim
```

attributetype is the type of file and can be *Delimited UTF8/ASCII* or *Excel*.
Attributepath is the file name/location to load.
delim is the delimiter to use for the **attributetype**. This value is ignored for *Excel* inputs.

Edge Colors can be specified after attribute data by adding:

```
|typeR|file|delim|typeG|file|delim|typeB|file|delim
```

type is the type of file and can be *Delimited UTF8/ASCII* or *Excel*.
file is the file name/location to load.
delim is the delimiter to use for the **type**. This value is ignored for *Excel* inputs.

Examples using a Pipe Delimiter:

```
Matrix-Excel|My Matrix|C:\matrix.xls||Strength|Delimited UTF8/ASCII|c:\att.txt|Comma|Excel|c:\red.xls
Matrix-Delim|My Matrix 2|C:\matrix2.txt|Tab|Distance|Excel|c:\att.xls||Excel|c:\red.xls||Excel|c:\blue.xls||Excel|c:\green.xls
```