



CHAPTER 10

TE Topology

The TE Topology tool provides a graphical view of the network set up through the Cisco IP Solution Center Traffic Management (TEM) web client. It gives a graphical representation of the various network elements, including devices, links, and tunnels. It also displays devices that TEM is unable to identify but which have been discovered with the TE Discovery tool to be part of the network.

This chapter describes how to use the topology tool. A definition of fields and buttons in the topology GUI is found in [TE Topology, page B-5](#) in [Appendix B, “Traffic Engineering Management GUI”](#).

This chapter includes the following sections:

- [Overview, page 10-1](#)
- [Accessing the TE Topology Tool Page, page 10-2](#)
- [Using the TE Topology Interface Applet, page 10-2](#)
 - [Displaying and Saving Layouts, page 10-5](#)
 - [Using Maps, page 10-6](#)
 - [Using Highlighting and Attributes, page 10-9](#)
 - [Using Algorithms, page 10-11.](#)

Overview

The TE Topology tool can be activated from various locations within ISC. However, in this user guide the TE Topology tool is assumed to be accessed from the Traffic Engineering Management Services page.

The TE Topology tool is used to visualize the TE network based on the data contained in the repository. To that end, it provides a number of ways of manipulating the display, for example by applying algorithms to the graph layout, importing maps, and so on.

The tool is accessed from a TE Topology Interface Applet that displays the TE topology through a Java applet within the browser.

Accessing the TE Topology Tool Page

The TE Topology tool is accessed as follows:

- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > TE Topology**.

The Topology Tool window in [Figure 10-1](#) appears.

Figure 10-1 Topology Tool

Topology Tool

View topology maps.

- ISC-VPN Topology**
Launches a Java™ Web Start application that presents graphical views of VPNs, Regions, and Access Domains.
- ISC-TEM Topology Interface Applet**
Launches the ISC-TEM Topology Interface Applet.

Java Runtime Environment (JRE) and Java Webstart must be installed to run Inventory Manager. If you are having trouble getting them to function properly or need to update your local JRE please download and install one appropriate for your operating system.

JRE Description	Platform	Version	Supported
Windows (all languages, including English)	Windows	1.6.0_07	Yes
Solaris SPARC 32-bit self-extracting file	Solaris SPARC	1.6.0_07	Yes
Linux self-extracting file	Linux	1.6.0_07	No

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For a detailed description of the Topology Tool page, see the [Cisco IP Solution Center Infrastructure Reference, 5.1](#).

- Step 2** To start up the TE Topology tool, select **ISC-TEM Topology Interface Applet**.

Using the TE Topology Interface Applet

The TE Topology Interface Applet (Topology Applet) provides a means of visualizing the network and tunnels present in the network. The web-based GUI is the primary means of visualizing the network information. The Topology Applet simply augments the web-based GUI to provide you with a different presentation format.

The features offered through the Topology Applet are:

- TE Topology rendering
- Highlighting of network elements
- Tunnel overlay (unmanaged, primary, and backup)
- Topology layout persistence
- Integration with web page content.

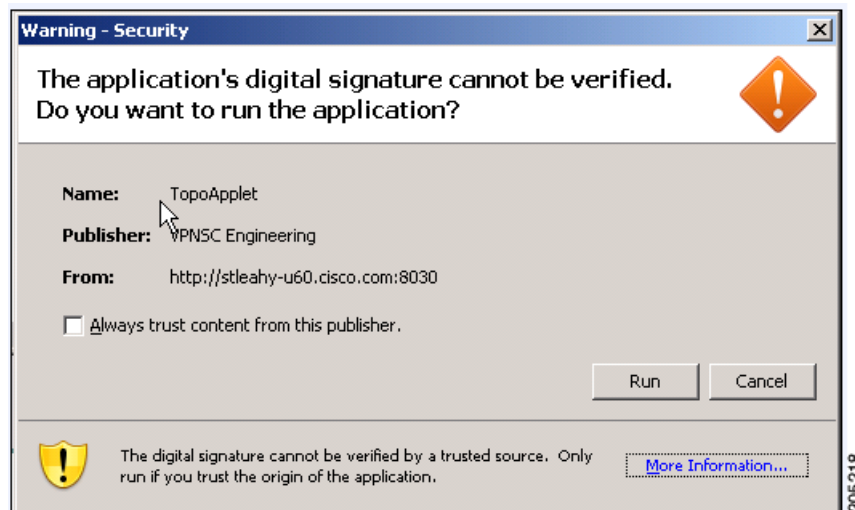
To access the Topology Applet, use the following steps:

Step 1 Choose **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > Topology Tool**.

Step 2 Click **ISC-TEM Topology Interface Applet**.

If the security certificate for the topology applet has not been accepted previously, you might get the following security warning window shown in [Figure 10-2](#).

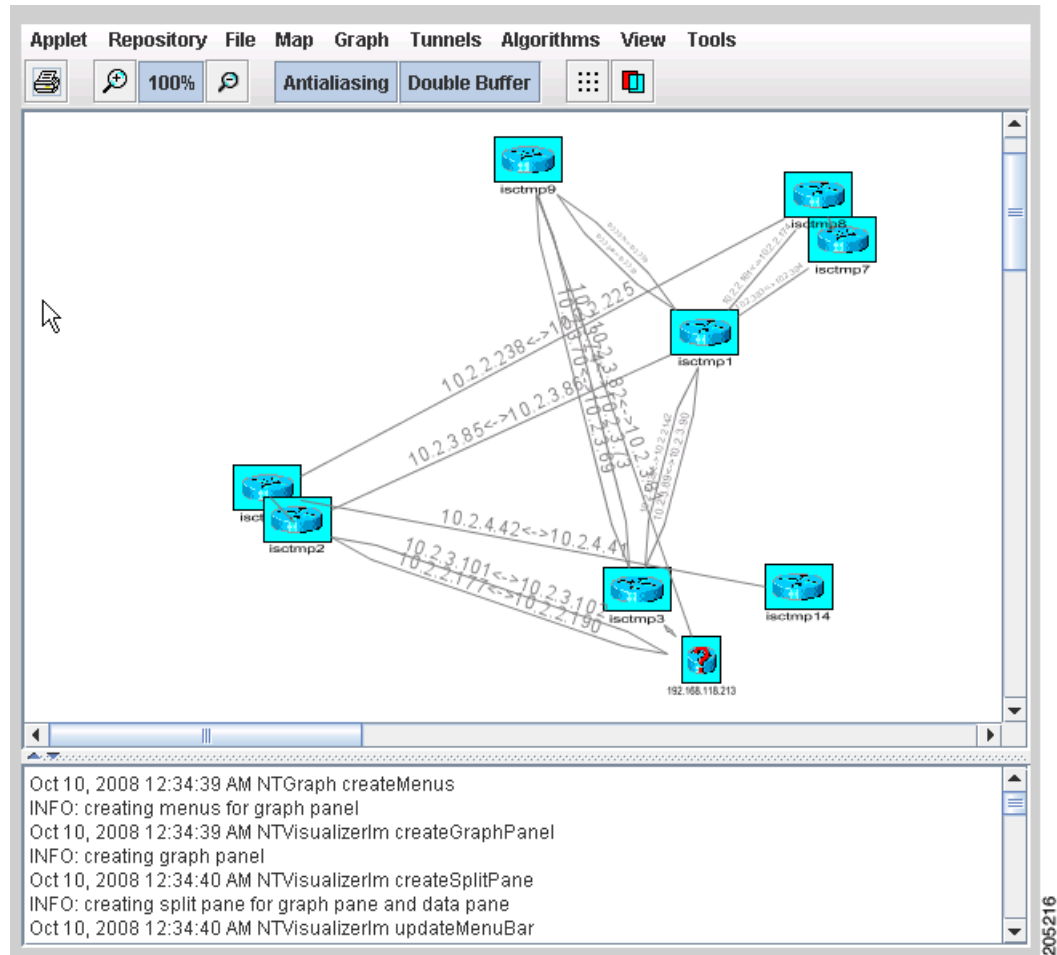
Figure 10-2 Security Warning



Step 3 Click **Yes** or **Always** to accept the authenticity of the security certificate.

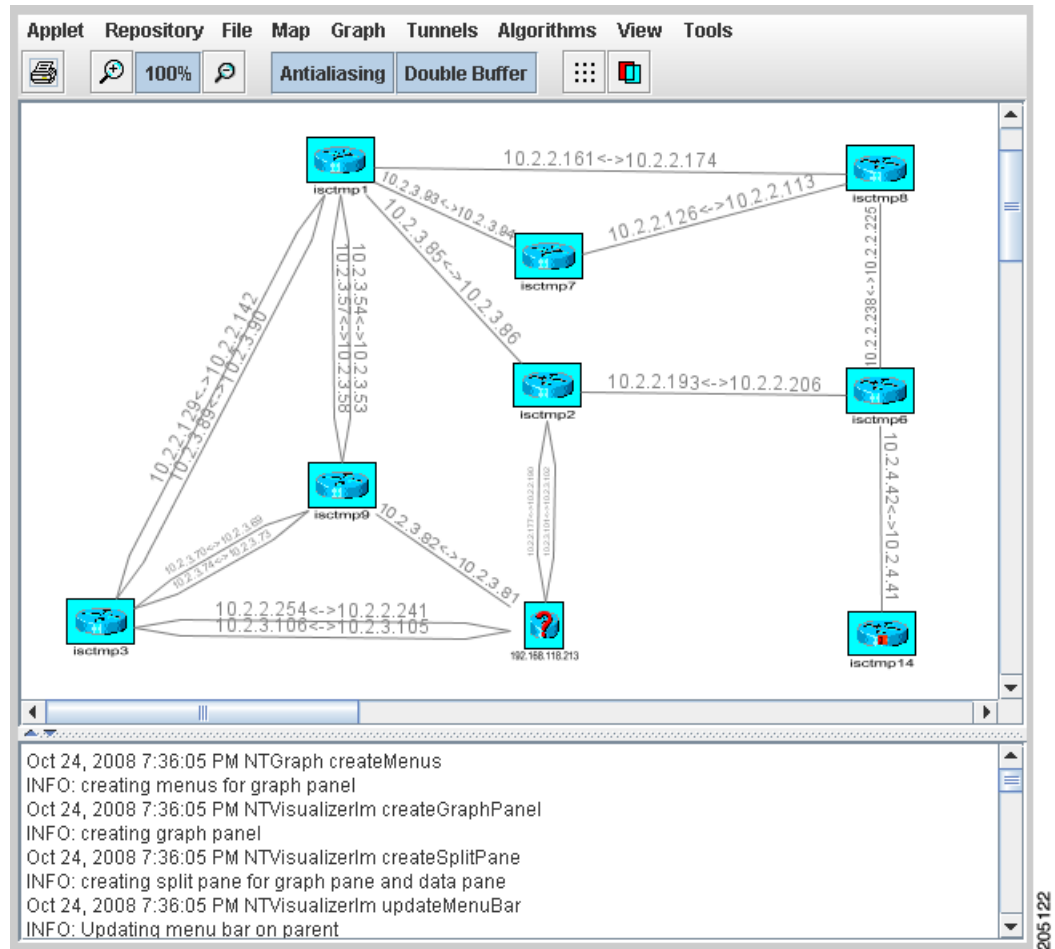
The Topology Display applet window in [Figure 10-3](#) appears.

Figure 10-3 Topology Display Applet in Unordered State



After the nodes have been arranged to your liking, you might end up with a topology display similar to the one in [Figure 10-4](#).

Figure 10-4 Topology Display Applet with User-Arranged Topology



Icons marked with red question marks signify devices unknown to ISC, for example non-Cisco devices. When activated with the Display button from another ISC function (tunnel management window, resource modification window, etc.), any selected devices are highlighted in the display.

For an explanation of the various window elements in all the menus of the Topology Display, see [Topology Display, page B-5](#).

Displaying and Saving Layouts

Use the two operations in the **Repository** menu, **Layout Graph** and **Save Graph Layout**, to display or save the current layout of the network graph.

Prior to generating the graph layout, the coordinates must be set on each of the network devices. Otherwise, the graph will have a random layout.

- **Layout Graph**—The graph is laid out from the repository. If a graph layout is already present, that layout is cleared once you click **Yes** in the **Clear Graph Layout** confirmation box. If the layout has not previously been saved, a random layout of the repository contents is drawn. If it has been saved previously, the saved layout is redrawn.

- **Save Graph Layout**—Save the current graph layout. Doing so will ensure that whenever the graph layout is cleared with **Layout Graph** or the topology applet is closed, the same layout will be created when the applet is restarted. If a map was used, the map is also redrawn.

Using Maps

You can associate a map with each view. Currently, the topology viewer only supports maps in the Environmental Systems Research Institute, Inc. (ESRI) shape format. The following sections describe how to load maps and selectively view map layers and data associated with each map.

The map features are accessed from the **Map** menu in the Topology window.

To access the **Map** menu, use the following steps:

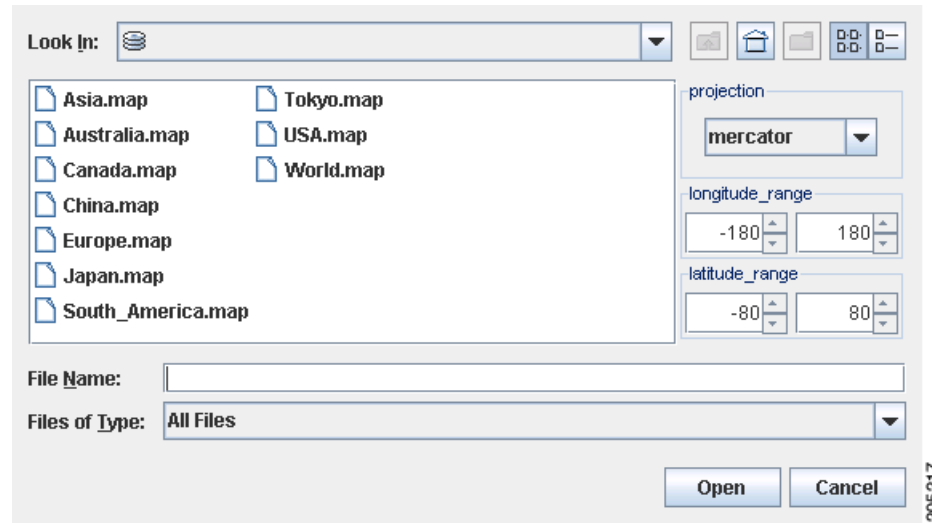
-
- Step 1** Choose **Service Inventory > Inventory and Connection Manager > Traffic Engineering Management > TE Topology**.
- Step 2** Start the **ISC TM Topology Interface Applet**.
- If link and node data for your network is already in the repository, a Progress Report lists the various network elements as the corresponding data is loaded.
- Step 3** Select the **Map** menu.
- The menu appears.
- From the **Map** menu, you can either load or clear (remove) maps as described in the following.
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Loading a Map

You might want to set a background map showing the physical locations of the displayed devices. To load a map, use the following steps:

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- Step 1** In the menu bar, select **Map > Load**.
- Providing the web map server is running, the Map Chooser window appears (see [Figure 10-5](#)).

Figure 10-5 Map Chooser



For an explanation of the various window elements, see [Map](#), page B-8.

Step 2 Make your selections in the Map Chooser window.

The right-hand side of the window contains a small control panel, which allows you to select the projection in which a map is shown. A map projection is a projection which maps a sphere onto a plane. Typical projections are Mercator, Lambert, and Stereographic.

For more information on projections, consult the Map Projections section of Eric Weisstein's World of Mathematics at:

<http://mathworld.wolfram.com/topics/MapProjections.html>

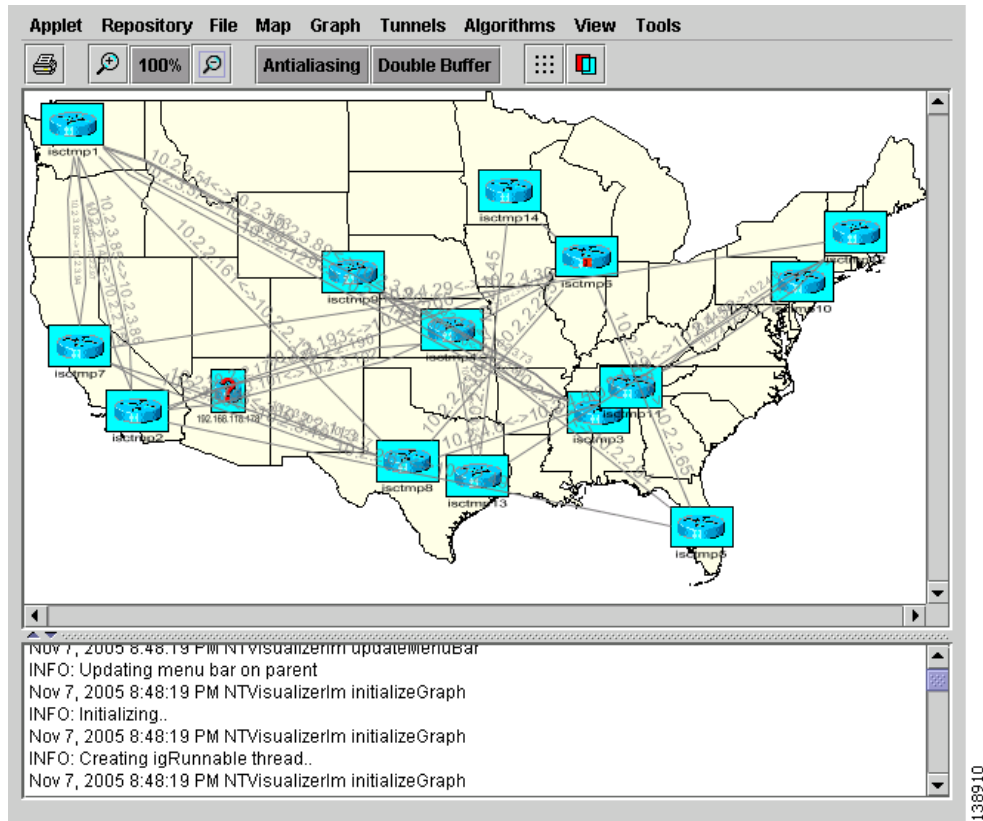
If desired, make changes to the settings in the **Longitude Range** and **Latitude Range** fields.

Step 3 Select a map file and click **Open** to load the map.

Selecting the map file and clicking the **Open** button starts loading it. Maps can consist of several components and thus a progress dialog is shown informing you which part of the map file is loaded.

A map similar to the one in [Figure 10-6](#) appears.

Figure 10-6 Loaded Map



- Step 4** Use the various functions in the menus of the Topology Display window to manipulate the display contents in the Topology view. Some of these are described in subsequent sections. For a more complete description of the menu functions available, see [Topology Display, page B-5](#).

Adding New Maps

You might need to add your own maps to the selection of maps available to the Topology Tool. This is done by placing a map file in the **\$ISC_HOME/resources/webserver/tomcat/webapps/ipsc-maps/data** directory or a subdirectory thereof within the ISC installation. To make this example more accessible, assume that you wish to add a map of Toowong, a suburb of Brisbane, the capital of Queensland. The first step to do so is to obtain maps from a map vendor. All maps must be in the ESRI shape file format (see **ESRI shapefile technical description**). In addition, a data file can accompany each shape file. Data files contain information about objects and the corresponding shapes are contained within the shape file. Let us assume that the vendor provided four files:

- toowong_city.shp
- toowong_city.dbf
- toowong_street.shp
- toowong_street.dbf

We have to create a .map file that informs the TE Topology tool about layers of the map. In this case we have two layers: a city and a street layer. The map file, say, Toowong.map, would thus have the following contents:

```
toowong_city
toowong_street
```

It lists all layers that create a map of Toowong. The order is important, as the first file forms the background layer, with other layers placed on top of the preceding layers.

Having obtained shape and data files and having written the map file, place all five files in the **\$ISC_HOME/resources/webserver/tomcat/webapps/ipsc-maps/data** directory. All map files must be located in this folder. After this is done, the map is automatically accessible to the topology viewer.

Clearing Maps

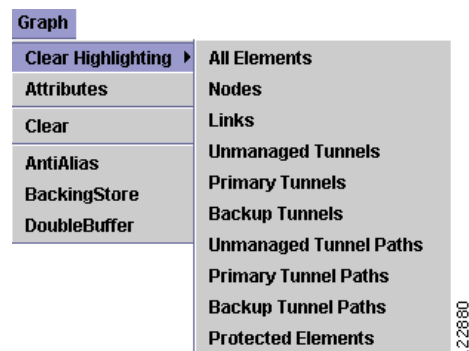
To clear the active map, select **Map > Clear** (see [Figure 10-3](#)).

Use this feature to clear (remove) the active map to leave only nodes and links in the corresponding network.

Using Highlighting and Attributes

The **Graph** menu, shown in [Figure 10-7](#), provides access to a range of tools to manage and manipulate graphs.

Figure 10-7 Graph Menu



For an explanation of the various menu items, see the following sections as well as [Graph, page B-9](#).

Use the JavaServer Pages to look at the list of nodes, links, and tunnels. From the JSP pages, select the display button at the bottom of the window to highlight elements.

The tools in the **Graph** menu serve to modify the appearance of the topology.

These are described in the following sections.

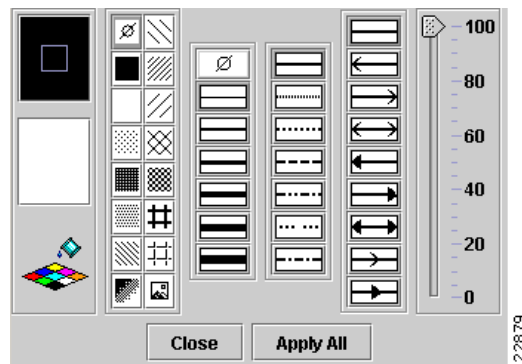
Clear Highlighting

Clear Highlighting serves to remove highlighting from specific elements as listed in its submenu. For a description of the individual entries, see [Graph, page B-9](#).

Add/Modify Attributes

When you select **Attributes** from the **Graph** menu, the Graphic Attributes window in [Figure 10-8](#) appears.

Figure 10-8 *Graphic Attributes*



The **Add/Modify Attributes** tool is used as follows:

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- Step 1** Select graph elements (nodes/links) in the topology display.
Use Ctrl/Shift to select multiple elements.
 - Step 2** Choose **Graph > Attributes** to open the Graphic Attributes window.
 - Step 3** Change the desired attributes and click **Apply All**.



Note Only selected links ([Step 1](#)) are affected.

Clear Current Graph Layout

Use the **Clear** function in the **Graph** menu to remove the topology graph from the current view.

Although this is also achieved with **Layout Graph** in the **Repository** menu, **Layout Graph** re-creates the graph last saved in the repository in addition to clearing the graph.

Using AntiAlias, BackingStore, DoubleBuffer

AntiAlias, found in the **Graph** menu, is used to create smoother lines and a more pleasant appearance at the expense of performance.

BackingStore allows graphics content to be automatically saved when moved to the background and regenerated when returned to the foreground. This helps avoid superfluous refreshing.

DoubleBuffer enables double buffering for dragging elements on the graph.

Using Algorithms

In the **Algorithms** menu, shown in [Figure 10-9](#), various algorithms can be used to enhance and otherwise alter the graph layout.

**Note**

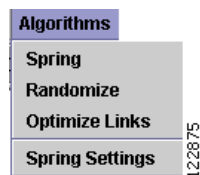
The algorithms only work when the nodes are interconnected with links.

Spring is a graph layout algorithm that optimizes the graph layout based on weights.

Randomize rearranges the nodes in the current topology layout at random.

If there are overlapping links, the layout can be optimized by selecting **Optimize Links**.

Figure 10-9 Algorithms Menu



For further explanation of the **Algorithms** menu, see [Algorithms, page B-11](#).

The spring settings are used to enhance the appearance of the topology display according to user preferences. When selecting **Spring Settings**, the Spring Settings window in [Figure 10-10](#) appears.

Figure 10-10 Spring Settings

The image shows a 'Spring Settings' dialog box with the following sections and controls:

- Propagation:** A checked checkbox labeled 'Propagate'.
- Specify layout size:** An unchecked checkbox followed by a text input field containing '265350.0'.
- Horizontal /vertical alignment:** Two rows of radio buttons. The first row has 'Left', 'Center' (selected), and 'Right'. The second row has 'Top' and 'Center' (selected).
- Use objects' sizes:** A checked checkbox.
- Fix selected objects:** An unchecked checkbox.
- Automatic edge length:** A checked checkbox.
- Edge length constant:** A text input field containing '1000.0'.
- Repaint period:** A text input field containing '0.0'.
- Epsilon:** A text input field containing '1.5'.
- Single components settings:**
 - Automatic horizontal spacing:** A checked checkbox.
 - Horizontal spacing:** A text input field containing '10.0'.
 - Vertical spacing:** A text input field containing '10.0'.

At the bottom of the dialog are three buttons: 'Apply', 'Reorder', and 'Close'. A vertical label '122888' is positioned to the right of the dialog box.

For an explanation of the various fields in the Spring Settings window, see [Algorithms, page B-11](#).