CHAPTER 7

Working with Links

This chapter describes how to view information about the physical links between ports and sub-ports. In addition, it describes adding and removing links between devices.

- Opening Link Properties, page 7-2, describes how to open the Link Properties dialog box.
- Monitoring Link Properties, page 7-3, describes the Link Properties dialog box and how to view information about the physical links between ports.
- Viewing Impact Analysis, page 7-4, describes how the user can select a network link and calculate the potentially affected parties in the event of the selected link going down.
- Adding a Link, page 7-6, describes how to add links between devices.
- Working in Links View, page 7-8, describes the links view, including how to filter the links.

The Cisco ANA solution enables the continuous automatic discovery of connectivity between all network elements. Using the automatic discovery mode, all the links in the network are discovered automatically. Auto-discovery is an ongoing process that maintains the real topology information of the network. Cisco ANA NetworkVision discovers any new links that are added and continues to verify that the discovered links still exist.

Link properties are displayed for the following types of links:

- Between two devices.
- Between a device and an aggregation of devices or aggregation of aggregations, which connects this device to another device inside the aggregation(s).
- Between two aggregations, which contains devices that cross the aggregations.

The links or aggregated links presented in the map pane:

- Display arrowheads if they are unidirectional
- Have no arrowheads if they are bi-directional

In addition, the links displayed in the map pane have tool tips that provide the user with information regarding the number of links and partially describe the list of links. Physical links are highlighted bold. The links displayed in the map pane can be filtered. For more information see Filtering Links According To Type, page 4-17.

Opening Link Properties

The properties of the physical links between two ports are viewed using the Link Properties dialog box. ATM, Frame Relay, Ethernet and Serial are some of the examples of the technologies that Cisco ANA currently supports links.

Note The color of a selected link is customizable. The default color is blue. For more information on link colors see Chapter 2, "Getting Started".

To open link properties:

Step 1 Select a link between two devices in the map pane.

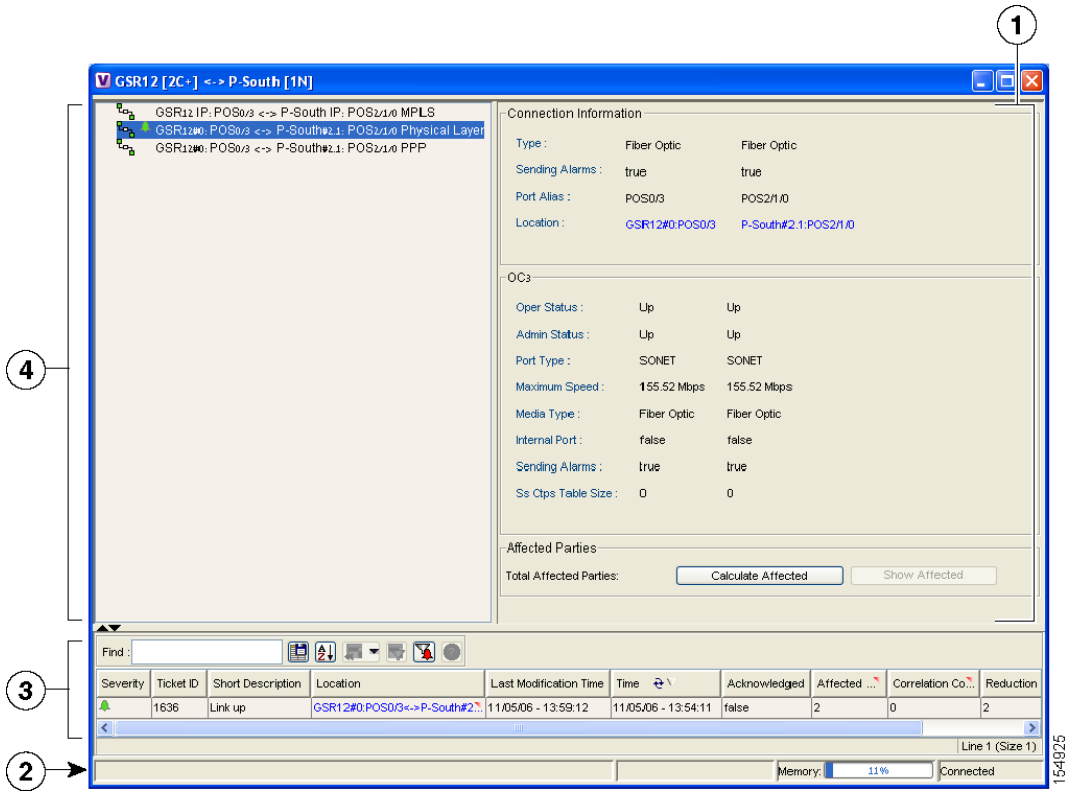
Step 2 Right-click on the selected link to display the Link shortcut menu.

Step 3 From the Link shortcut menu, select **Properties**,

or

Double-click on the link. The Link Properties dialog box is displayed.

Figure 7-1 Link Properties Dialog Box



1	Properties pane
2	Status bar
3	Ticket pane
4	Link List pane

Note If there are a few links between the devices or aggregations, the Link Properties dialog box displays the information of all the links.

Step 4 Click **Close** to close the Link Properties dialog box. The Cisco ANA NetworkVision window is displayed.

Monitoring Link Properties

The Link Properties dialog box is divided into the following areas:

- Link List Pane
- Properties Pane
- Ticket Pane

All the areas displayed in the Link Properties dialog box are correlated; this means that selecting an option in one area affects the information displayed in the other areas.

The information displayed in the Link Properties dialog box changes according to the ports or sub-ports selected in the Link List pane.

Link List Pane

The Link List pane displays a list of the links that are represented by a single link on the map. Each link has a single entry in the Link List pane.

When a branch is selected in the Link List pane, the information displayed in the properties pane is updated. The color of the icon in the Link List pane reflects its severity. For more information about severity see Status of Network Objects, page 2-15.

The heading and the Link List pane display the left and right link identifiers between the two nodes, the device alias and CTP.

Properties Pane

The properties pane enables you to view the following, depending on your selection in the Link List pane:

- Properties of a selected link, including port properties information
- Hyperlink to ports inventory access
- Status

The properties pane displays the connection information type, port alias and port location (a hyperlink) information, all which uniquely identify the port. Port location information is also displayed as a hyperlink to the Inventory window.

The properties pane displays the parameters for the different sides of the link, aligned under the relevant link identifier. Any discrepancies between the link's ports are colored red.

The properties pane enables you to view the statistics of the traffic on the link. The following fields are displayed in the Connection Information area:

- **Type—**The type of connector, for example, fiber optic.
- **Sending Alarms—**The status of alarms on the port of the device, enabled (true) or disabled (false).
- **Port Alias—**The name used in the device CLI or EMS for the selected port.
- **Location—**The location of the entity, slot number and port on the slot, as a hyperlink that opens the properties of the relevant location.

The following fields may be displayed in the properties pane:

- **Oper Status—**The operation status, Up or Down.
- **Admin Status—**The port configuration, Up or Down.
- **Port Type—**The specific port type, for example, OC3 or Ethernet.
- **Maximum Speed—**The maximum port speed in Mbps.
- **Media Type—**The type of cable used, for example, fiber optic.
- **MAC Address—**The MAC address.
- **Distribution Protocol Type—**The distribution protocol type, for example, LDP.

The following buttons are displayed in the Affected Parties area for physical links:

- **Calculate Affected—**Calculates and retrieves the total number of potentially affected entities.

Note This button is displayed when selecting a physical layer Link.

- **Show Affected—**Displays the properties of the affected parties after clicking **Calculate Affected**.

Note This button is enabled when the **Calculate Affected** button is clicked.

Viewing Impact Analysis

Cisco ANA NetworkVision enables the user to select a network link and calculate the potentially affected parties (proactive impact analysis) in the event of the selected link going down, the fault has not actually occurred).

Note This section only applies to physical links.

To calculate impact analysis:

Step 1 Select a context in the tree pane, and click **Links View** on the toolbar. The links view is displayed in the workspace.

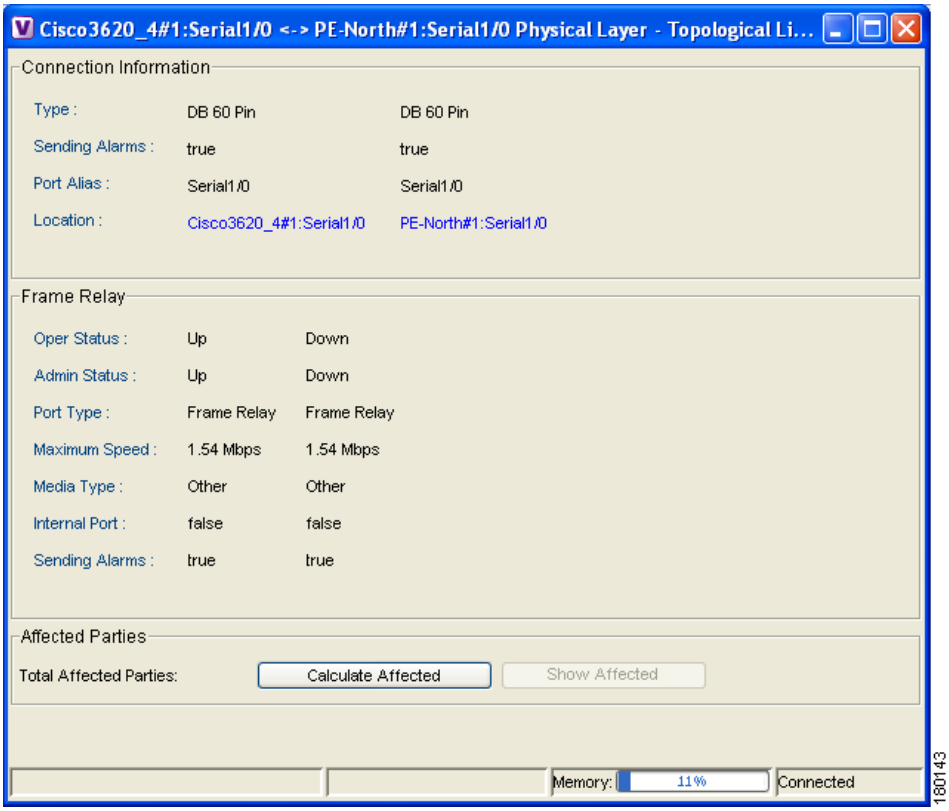
Step 2 On the toolbar, click **Map Options**. The Map Options dialog box is displayed. For information about the Map Options dialog box see Filtering Links According To Type, page 4-17.

Step 3 Select **Physical** from the Group dropdown list, and click **OK**. Only the physical links for the selected context are displayed in the links view.

Step 4 Select the required physical link in the links view.

Step 5 Right-click on the selected link to display the shortcut menu, and select **Properties**. The Topological Link Properties window is displayed.

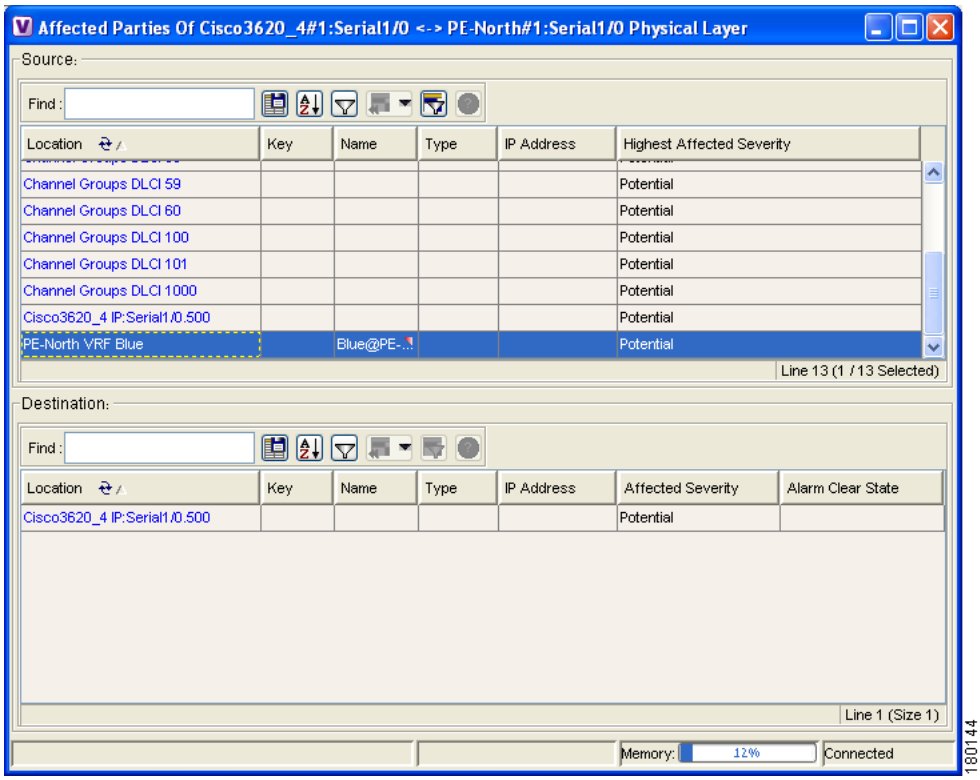
Figure 7-2 Topological Link Properties Window



Step 6 Click **Calculate Affected**. The total number of potentially affected parties is displayed in the Affected Parties area.

Step 7 Click **Show Affected**. The Affected Parties dialog box is displayed.

Figure 7-3 Affected Parties Dialog Box



Step 8 Click in the upper right corner to close the Affected Parties dialog box.

Step 9 Click in the upper right corner to close the Topological Link Properties dialog box. The Cisco ANA NetworkVision window is displayed.

Adding a Link

Cisco ANA NetworkVision enables you to manage the links between devices (topology), to add a new static link between two devices.

A dynamic link is a link that is detected by Cisco ANA and connected automatically. A static link is a link that you can manually enter.

Cisco ANA NetworkVision enables you to add a static link by selecting a device or port and defining it as the A side. A second device or port is then defined as the Z side.

Cisco ANA validates the new link after the two ports are selected. Validation checks the consistency of the port types (for example, RJ45 on both sides), and Layer 2 technology type (for example, ATM OC-3 on both sides).

When adding a new link the state of the link reflects its current state. For example, if the operation status of a port is down, the link is colored red.

You can add links from either the Cisco ANA NetworkVision window's Tree and map pane (method 1), or from the Inventory window tree pane (method 2).

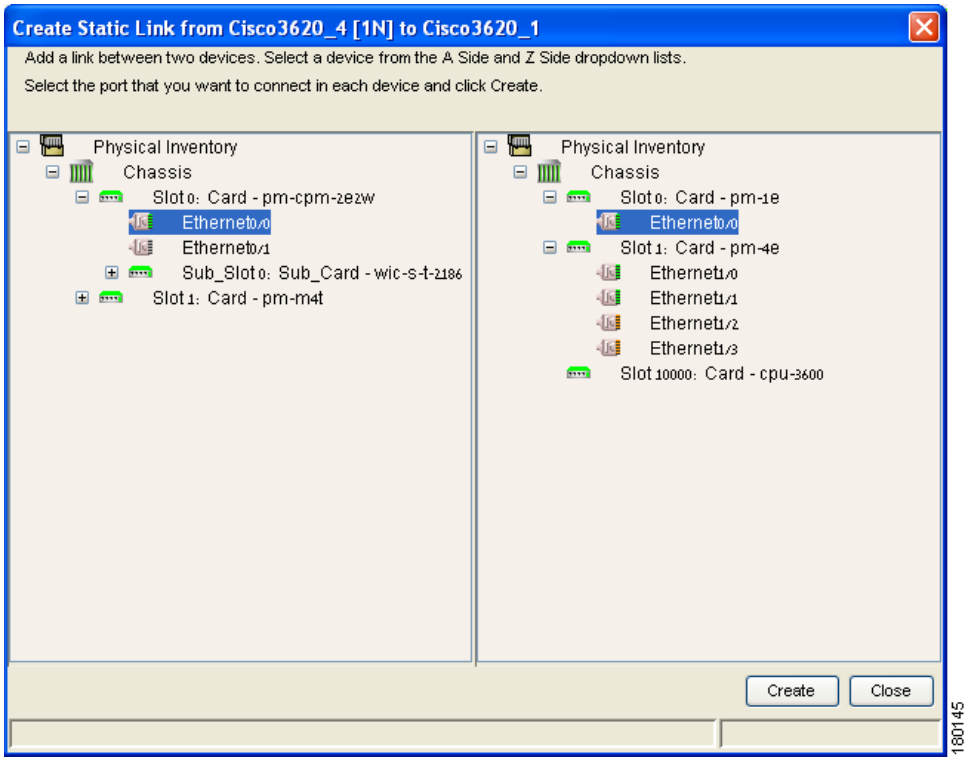
In addition, a new link can be added using Cisco ANA Manage. For more information refer to the *Cisco Active Network Abstraction Administrator Guide*.

To add a link (method 1):

Step 1 Right-click on the required A Side device in the tree pane or map pane of the Cisco ANA NetworkVision window's workspace to display the right-click shortcut menu, and select **Topology | Mark as A Side**.

Step 2 Right-click on the required Z Side device in the tree pane or properties pane to display the right-click shortcut menu and select **Topology | Mark as Z Side**. The Create Static Link dialog box is displayed enabling you to select the port to be connected.

Figure 7-4 Create Static Link Dialog Box



Step 3 Drill down and select the required port on the A Side device and Z Side device.

Step 4 Click **Create** to validate the connection and create the new link. A success message is displayed.

Note A warning message is displayed if:
One of the validation checks fails
The operation status of one port is Up and the other port is Down
The ports selected are not of the same type
The Layer 2 technology type is not the same
If one of the ports is part of another link
Click **No** to cancel the connection.

Step 5 Click **Close** to display the Cisco ANA NetworkVision window again.

To add a link (method 2):

Step 1 Open the Inventory window for the required A Side device.

Note For more information about opening the Inventory window see Opening the Inventory Window, page 6-1.

Step 2 Drill down to the required port in the Inventory window tree pane.

Step 3 Right-click on the required A Side port to display the right-click shortcut menu and select **Topology | Mark as A Side**.

Step 4 Repeat steps 1-2 for the Z Side device.

Step 5 Right-click on the required Z Side port to display the right-click shortcut menu and select **Topology | Mark as Z Side**. A confirmation message is displayed.

Step 6 Click **Yes.** The ports are connected, and a new link is created between the selected ports.

Note A warning message is displayed if:
One of the validation checks fails
The operation status of one port is Up and the other port is Down
The ports selected are not of the same type
The Layer 2 technology type is not the same
If one of the ports is part of another link
Click **No** to cancel the connection.

For information about removing a static link, refer to the *Cisco Active Network Abstraction Administrator Guide*.

Working in Links View

The links view provides you with an easy to access complete table list of the various types of physical links displayed on the map (the links shown in the map pane are a summary of the many links starting from one side and ending at the other side of the link) and their status.

Note Business links are not currently supported in the links view. For more information about business links refer to the *Cisco Active Network Abstraction Managing MPLS User Guide*.

Click **Show Links View** to display the links view in the Cisco ANA NetworkVision window. The links view is displayed.

Note An external link to the network has a gray cell background in the table, and you can open the Inventory window by clicking on the hyperlink. For more information about external links, see Working in Links View, page 7-8.

Any links that are added or removed from the map are automatically added or removed from the links view provided they have not been filtered out.

The links view displays the selected filtered links and the new location in the tree pane:

- When the user navigates in the tree pane or,
- When the user selects devices and/or aggregated nodes in the map pane.

The following columns are displayed in the links view:

- **Context—**The name of the map, aggregated node or sub-aggregated node containing the link (there may be multiple contexts).
- **Severity—**Displays a severity bell icon, which is colored according to the severity of the alarm on the link. This indicates the impact of the alarm on the network. For more information about severity, see Status of Network Objects, page 2-15.
- **A End-Point—**The device or site that is the source of the link as a hyperlink to the inventory of the device or site.
- **Bi Directional—**The direction of the link, true (bi-directional) or false (unidirectional).
- **Z End-Point—**The device or site that is the destination of the link as a hyperlink to the inventory of the device or site.
- **Link Type—**The type of link, for example, Physical Layer, VPN or MPLS.

Note

- Clicking on a red triangle displayed in a cell expands the cell to display all the information.
- Clicking on a header in the links view sorts the information displayed, for example, according to Severity.

The links displayed in the links view are by default sorted according to Link Type and Deep collection method. In addition, the links view can be sorted:

- According to a column by clicking on the required column heading. The  icon is displayed next to the selected column heading.
- In ascending or descending order by clicking on the column heading or the Sort Table Values button on the toolbar. A triangle is displayed next to the selected column heading. For more information see Finding Text in a Table, page 3-2.

The Location field displays the number of selected rows and the total number of rows in the table, for example, 2/16 Selected. In addition, it displays the location of the selected row(s) in the table, for example, Line 3.

The Find field enables you to search for information in the links view table according to the selected column.

For more information about the standard buttons displayed in Cisco ANA NetworkVision's tables and table functionality see Opening a Map, page 4-4.

The following additional buttons are displayed at the top of the links view and enable you to filter the links using the collection method:

Table 7-1 Links View Tools

	**All Links—**Displays the complete list of links for the selected context (map, aggregation, or sub-aggregation).
	**External Links—**Displays the links where only one side of the link starts in this context (map, aggregation or sub-aggregation) and the other side ends somewhere else not in the map or outside of the currently selected context.
	**Flat Links (Surface)—**Displays the links currently visible on the map for the selected context (map, aggregation or sub-aggregation), excluding any thumbnails.
	**Deep Links—**Displays the links for the current aggregations and the sub-aggregations where both of the endpoints are somewhere within the currently selected context.

For more information about filtering links using the collection method see Filtering Links Using the Collection Method, page 7-10.

Some of the functions that can be performed in the links view are:

- View all the links or only the filtered links of a selected context using the collection methods, All, External, Flat and Deep. For more information see Filtering Links Using the Collection Method, page 7-10.
- View and filter the links according to type using the Map Options dialog box. For more information see Filtering Links According To Type, page 4-17.
- Locate the source of a link in the map. For more information see Finding a Link Source, page 4-15.
- Sort the links displayed.
- View link properties.

Filtering Links Using the Collection Method

The links view table is a very powerful tool allowing you to "view" NEs links that you cannot see visually or graphically in the map pane in the Cisco ANA NetworkVision window's workspace. The links view table is dynamic and automatically refreshes itself, allowing you to view up to date network links in real-time.

The collection method enables you to filter the links displayed in the links view based on the selected context (map, aggregation or sub-aggregation). By selecting the collection method from the toolbar in the links view table, the user can quickly filter the links.

Note

- By default the Deep collection method is applied in the links view.
- The filter only applies to the links view; it has no effect elsewhere in Cisco ANA NetworkVision.

For more information about the buttons displayed in the links view, see Working in Links View, page 7-8.

For more information about filtering links according to type, see Filtering Links According To Type, page 4-17.

To filter links according to the collection method:

Step 1 In the Cisco ANA NetworkVision window's toolbar, click **Links View** to display the links view in the Cisco ANA NetworkVision window's workspace.

Step 2 Select the required context in the Cisco ANA NetworkVision window's tree pane or links view in the Cisco ANA NetworkVision window's workspace.

Step 3 In the links view toolbar select one of the following collection method options:

- All Links
- External Links
- Flat Links
- Deep Links

The links are displayed in the links view according to the defined collection method.

Cisco ANA NetworkVision also enables you to find the source of a link displayed in the links view by highlighting the link in the map pane.

To find the links source:

Step 1 Right-click on the required link in the links view to display the Links View menu.

Step 2 Select **Find Source** from the Links View shortcut menu. The source of the link is highlighted in the map pane,

or

If there are two or more links that are the same, for example, a VRF link, the Select Link Context dialog box is displayed. Select the required link context from the dropdown list, click **OK**. The source of the link is highlighted in the map pane.

Note A blue link highlights the source of the link in the map pane.

Note Click the NE in the tree pane or the link in the map pane to remove the highlight from the selected link.