Network Views

The word "network" is an ubiquitous and powerful metaphor found in many different fields of research and application. Flow charts in project planning, text graphs in hypertext systems, cognitive models of memory and knowledge representation (semantic networks) are all networks that serve to represent complex information by intuitively accessible graphic means. One of the most attractive properties of graphs is their intuitive graphical presentation, mostly in form of two-dimensional layouts of labeled nodes and links.

Further Resources

You find detailed tutorials on the CAT website:

- Quick start guide: http://cat.ucsur.pitt.edu/CAT_quickstart_final.pdf
- Instructions for preparing ATLAS.ti data for upload: http://cat.ucsur.pitt.edu/uploadInstructions.aspx
- Video tutorial for preparing ATLAS.ti for upload: http://www.screencast.com/users/stustu12/folders/Default/media/ffea5d4-2487-4535-9f79-71421910ec14

Figure 266: Validation process: Checking for differences
In contrast with linear, sequential representations (e.g., text), presentations of knowledge in networks resemble more closely the way human memory and thought is structured. Cognitive "load" in handling complex relationships is reduced with the aid of spatial representation techniques. ATLAS.ti uses networks to help represent and explore conceptual structures. Networks add a heuristic "right brain" approach to qualitative analysis.

Along with using networks for "mind mapping" and the visual design of theoretical models, you can exploit the structural properties of code-networks to enhance the retrieval of quotations. Using networks for retrieval purposes is a well known technique in information retrieval. In that domain, a structured sets of keywords is usually referred to as a thesaurus. This usage of networks for semantic retrieval will be described at "Semantic Operators" on page 255 in more detail.

Nodes And Links

The term "network" is formally defined within graph theory, a branch of discrete mathematics. A network is defined as a set of nodes (or "vertices") and links. A node in a network may be linked to an arbitrary number of other nodes.

The number of links for any one node is called its degree; e.g., a node with a degree of zero is not linked at all. Another simple formal property of a network is its order: the number of its nodes. You may make practical use of the degree of nodes by using it as a sorting criterion in the codes list window. The column 'Density' in the Code Manager represents the degree of a code.
Directed And Non-Directed Links

Links are usually drawn as lines between the connected nodes in graphical presentations of networks. Furthermore, a link between two nodes may be directed or not. A directed connection is drawn with an arrow. With directed links, source and target nodes must be distinguished. The source node is where the link starts and the target node is where it ends: the destination to which the arrow points. The terms connection and link are synonymous.

![Example of directed and non-directed links](image)

*Figure 268: Examples of directed and non-directed links*

Links are created either implicitly (e.g., when coding a quotation, the quotation is "linked" to a code), or explicitly by the user. The latter option is described in detail in this chapter.

Strictly speaking, code-quotation associations ("codings") also form a network:
But you cannot name these links, the code is simply associated with a quotation through the act of coding. In a network view you can visualize these links. In ATLAS.ti all unnamed links are referred to as weak links, all named links are referred to as strong links.

Strong And Weak Links

Strong links – or “first class” links – are links based on relations. Strong links are entities by themselves, with names, authors, comments, and other properties. A strong link is only a link between a code and another code or a quote and another quote.

Weak links are links that do not have individual properties, e.g., the links between quotations and codes, between codes and memos, between a family and its members.

Network Vs. Network View

The difference between a ‘Network’ and a ‘Network View’ is an important distinction that is necessary to understand the way networks are handled within ATLAS.ti.

An ATLAS.ti network is the set of all objects and their links inside the Hermeneutic Unit (HU). It exists independently of any display-oriented
characteristics (layout, color, line width, etc.). It is the *logical structure* of the HU’s objects. It exists even before the first Network View is created.

A Network View is typically only a subset of this global structure of nodes and links combined with an individual layout of nodes. It is like viewing the same thing, i.e., the network, from different angles and with different pieces visible.

Node Types

The user can manipulate and display almost all objects within the HU as nodes in a network view: quotations, codes, code families, memos, memo families, other network views, primary documents (PDs), and PD families. The following discussion applies to all nodes regardless of their type.

See “Node Types” on page 308 further details.

Relations

ATLAS.ti allows you to establish named links to more clearly express the nature of the relationships between concepts. With named links, you may express a sentence like “a broken leg causes pain” by two nodes (the source node “broken leg” and the target node “pain”) connected with a named link (“causes” or “is-cause-of”).

The name of a link is displayed in the Network Editor as a label attached to the link midway between the two connected nodes. Six pre-set relations - or link types - are available in ATLAS.ti. These standard relations can be substituted, modified, or supplemented by user-defined relations. The default relations are listed in the table below. C1 and C2 are source and target nodes, respectively.

<table>
<thead>
<tr>
<th>Relation</th>
<th>Label 1</th>
<th>Label 2</th>
<th>Width</th>
<th>Color</th>
<th>Formal Attribute</th>
<th>Layout Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 is-associated-with C2</td>
<td>==</td>
<td>R</td>
<td>1</td>
<td>Black</td>
<td>Symmetric</td>
<td>→</td>
</tr>
<tr>
<td>C1 is-part-of C2</td>
<td>[l]</td>
<td>G</td>
<td>1</td>
<td>Black</td>
<td>Transitive</td>
<td>↑</td>
</tr>
<tr>
<td>C1 is-cause-of C2</td>
<td>=&gt;</td>
<td>N</td>
<td>1</td>
<td>Black</td>
<td>Transitive</td>
<td>↑</td>
</tr>
<tr>
<td>C1 contradicts C2</td>
<td>&lt;&gt;</td>
<td>A</td>
<td>1</td>
<td>Black</td>
<td>Symmetric</td>
<td>→</td>
</tr>
<tr>
<td>C1 is-a C2</td>
<td>Isa</td>
<td>0</td>
<td>2</td>
<td>Black</td>
<td>Transitive</td>
<td>↑</td>
</tr>
<tr>
<td>C1 noname C2</td>
<td></td>
<td></td>
<td>1</td>
<td>Black</td>
<td>Symmetric</td>
<td>→</td>
</tr>
<tr>
<td>C1 is-property-of C2</td>
<td>*)</td>
<td>P</td>
<td>1</td>
<td>Black</td>
<td>Asymmetric</td>
<td>↑</td>
</tr>
</tbody>
</table>

Some of these characteristics directly affect the display of links, while others affect processing (e.g., search routines, automatic layout). A link between concepts is displayed in a Network Editor by a line with the relation’s label. You can choose from three different labels (label 1, label 2 and the name used for the menu when selecting a relation).
The “formal attribute” affects both the display and processing capabilities of a relation. For example: All asymmetric relations are symbolized in the Network Editor with an arrow pointing toward the target code. Symmetric relations are displayed with an arrow at both ends.

A typical transitive relation is the is-cause-of relation: if C1 is-cause-of C2 and C2 is-cause-of C3, it follows that C1 is-cause-of C3. Transitive relations also enable the “semantic retrieval” (see “Semantic Operators” on page 255).

The following properties are user-definable: the two labels and the menu text, which can be used as alternative display options, the width and color of the line linking two nodes, whether a link is directed or non-directed, and the preferred layout direction. The preferred layout direction affects the layout of a network when ATLAS.ti automatically arranges the nodes. See “Layout Procedures” on page 332.

**Link Vs. Relation**

It is important to understand the difference between a relation (or a link type) and the link itself: There is only one “is part of” relation, but potentially many links using it. In the Network View below, the relation “consequence” is used only once, while the relation “strategy” is used four times.

Another way to think of links and relations is to view links as instances of relations. Links are well informed about the characteristics of relations, which define their styles. If a characteristic of a relation is changed (e.g., line width, color, symbol), these changes are propagated to all links using it.

The Role Of Relations

It is useful to understand the role that relations play in the construction of a theory. The concepts (codes) that are linked using relations represent aspects of the problem domain under investigation. On the other hand, the relations used
to link these domain concepts are part of the methodology used to analyze the phenomena. As important epistemological tools they constitute the main questions that guide the development of a model or a theory.

The "Grounded Theory" method of Glaser & Strauss uses relations like "is-phenomenon," "is-context-of," "is-consequence-of," "is-condition-for," "is-strategy-for," etc., to relate concepts found during the data-oriented open coding phase.

In the analysis of argumentation structures, other relations are more suitable: e.g., "is evidence of," "is contradictory to," "warrants," etc. A medical expert attempting to capture diagnostic knowledge would use, e.g., "is-symptom-of," and "is medication for."

The Network Editor

The Network Editor offers an intuitive and powerful method to create and manipulate network structures. It favors a direct manipulation technique: You can literally "grab" codes, quotations, memos, or other objects using your cursor and move them around the screen as well as draw and cut links between them.

The following describes various methods available for creating and editing Network Views.

Network View Characteristics

Network Views have certain important characteristics:

- Several different Network Views on the same network are possible.
- Network Views can be given names under which they are stored and accessed inside the HU.
- Network Views can be commented.
- Network Views are displayed and edited in the Network Editor.
- Network Views allow individual layout of the nodes.
- As a node, a single object can be a member of any number of Network Views, just like a code can be an element of more than one code family.
- An object, e.g., a specific code, can only appear once in any Network View.

Network Views allow for a flexible but logically consistent display of the network of objects, so there are a few constraints to keep in mind:

If code A is linked to code B using the relation "is associated with", then every Network View that contains code A and code B will necessarily include the relation "is associated with" between the two. Furthermore, as only one link can exist between any two nodes at any given time, no Network View will display any other relation between those two nodes.
If however, you want to link code A and B differently in a different network view, then you need to work with “dummy or modifier codes”. These are empty codes, i.e. you have not used them for coding, but you need them to modify a relation.

![Diagram showing the use of modifier codes for case-based network views](image)

*Figure 271: Using modifier codes for case-based network views*

### Node Types

The following object classes can be displayed and edited as nodes within the Network Editor. The display characteristics of the nodes can be altered in a variety of ways.

#### Codes As Nodes

Codes are probably the most prominent objects in ATLAS.ti networks. They provide the main ingredients for models and theories.

#### Memos As Nodes

Memos in networks are often an important supplement to code networks. Several theoretical memos can be imported into a network to map out their relationship. The visual layout provides comfortable territory for moving from memo to memo to read and contemplate each individually and the relationship(s) between them.

When dragging a piece of text from a "drag-enabled" application (like MS Word™) into a Network Editor, the text becomes a memo with an automatically assigned title. The title can be renamed later.
Primary Documents As Nodes

PDs as nodes are useful sometimes, but in the presence of quotations may clutter the view by myriad links. However, PDs as nodes make a nice graphical content table for graphical primary documents. When selecting the option DISPLAY/FULL IMAGE FOR PDs, "thumbnail" images of the PDs are displayed. This option only affects graphical Pds.

Windows Explorer are used as standard icons for PD nodes (indicating the file of the document):

![Image](image1)

*Figure 272: examples of PD node icons*

Quotations As Nodes

Quotations and codes have one thing in common that is not true for the other objects. They can link to each other (quotations to quotations and code to codes) with fully qualified "first class" links using relations.

The inclusion of quotations in a Network View supports the construction and inspection of hyperlink structures.

![Image](image2)

*Figure 273: Display of quotations based on its media format*

Textual quotations can be included in a Network View by simply dragging a piece of text from the PD.
Families As Nodes

Families are a useful device to group codes, memos, or PDs that belong to one concept. Instead of displaying all of the codes belonging to the concept, the Code Family may be displayed.

The links between families and their members are depicted by a dotted red line.

Network Views As Nodes

The node icon and label for network views:

Network Views as nodes allow the inclusion of Network Views in other Network Views. The Network View’s context menu offers the option to open the View in a separate Network Editor. This is also available via double-click with Ctrl pressed.

Basic Network View Procedures
Creating Network Views

Two methods for creating Network Views are available. The first one creates an empty Network View into which objects are imported in sequential steps. The other method creates a Network View from a selected object and its neighbors.

TO CREATE A NEW NETWORK VIEW

1. Select Networks / New Network View from the HU editor’s main menu or from the drop down list offered by the Network button in the main toolbar.
2. Enter a name for the new Network View. A Network Editor opens.
3. Import nodes with any of the methods described in the section “Nodes” below.

TO OPEN A NETWORK VIEW ON AN OBJECT

A Network View for an object is created with a selected object and its neighbors. Proceed as follows:

1. Open an Object Manager (e.g., the Code Manager), or the HU Explorer, or right click on an object in the margin area.
2. Select one or more objects with a left mouse click.
3. In Object Managers, you can click the network button. For an object selected in the HU Explorer, select Open Network View from the context menu.
4. A Network Editor opens with the selected object and its neighbors.

If multiple objects are selected, their neighbors are not automatically included in the network view. You can import their neighbors in a subsequent step.

The nodes are initially placed using the semantic layout procedure, but can be rearranged manually.

More nodes can be added to this Network View using different techniques (see “Nodes” on page 311 for details).

Adding Nodes To A Network View

There are several options available for including objects in a Network View.
VIA DRAG & DROP

From Object Managers, the HU Explorer or the margin area: You can add nodes by dragging objects from Object Managers, the Network View Manager, the Family Manager, the margin, or the HU Explorer into the Network Editor. Drag & drop gives you better control of the initial position of the imported nodes.

- Open the Network View to which you want new objects imported.
- Open the manager(s) for objects (code list, memo list, etc.) that you want to import into a Network View.
- Select the node(s) you want to import into the Network View.
- Drag the selected objects into the Network Editor.

Drag selections of a primary text: This method creates nodes from textual quotations or new selections of text.

- Open the PD that contains the text that you want to import into a Network View.
- Make a selection within the PD or select an existing quotation.
- Drag the selected text into the Network Editor.
- Release the mouse button at the position you want the new node to be placed. A new node is created and displayed. If a quotation did not yet exist for the selection of text, it will now be created.

Drag text from other applications: This method allows you to drag text from drag & drop-compliant applications like Word™ into a Network Editor. Text dragged from Word™ is converted into a new memo and displayed as a node.

- Open the application from which you want to drag selections of text in to a Network Editor.
- Mark the piece of text within the (other) application.
- Move the mouse pointer over the selected text. The pointer changes its appearance
- Hold down the left mouse button and drag the selected text into the Network Editor.
- Release the mouse button at the position you want the new node to be placed with its upper left corner. A new node is created and displayed.

VIA THE IMPORT NODES DIALOG

The Import Nodes window offers access to all available node types. The list pane offers a context menu to select or deselect all displayed objects.

Choose Nodes / Import Nodes from the Network Editor's menu. A window opens, offering objects to be imported. Only objects that are not already members of the present view are listed.

First, select the type of node you want listed in the list pane from the node-type drop-down list.
Select the objects to be imported into the Network View.

Click Import.

The imported objects are placed along the upper left corner of the Network Editor. You can either distribute them manually by moving each node with the mouse, or you can place them automatically by (mis-)using the option LAYOUT / SEMANTIC LAYOUT.

Selecting Nodes And Links

Selecting nodes is an important first step for all subsequent operations targeted at individual objects within a Network View. Such operations have their corresponding menu commands in the main menu of the Network Editor.

TO SELECT A SINGLE NODE

Move the mouse pointer over the node and left click.

All previously selected nodes are deselected.

TO SELECT MULTIPLE NODES - METHOD 1

Hold down the Ctrl key on your keyboard.

Select a node as described above.

Repeat steps 1 and 2 for every node to be selected.

TO SELECT MULTIPLE NODES - METHOD 2 ("MARQUEE SELECTION"):

This method is very efficient if the nodes to be selected fit into an imaginary rectangle.

Move the mouse pointer above and left to one of the nodes to be selected.
Hold down the left mouse button and drag the mouse pointer down and right to cover all nodes to be selected with the selection marquee.

Release the mouse button.

Linking Nodes

The links between nodes in a network are real connections between the objects. Therefore, creating and removing links should not be regarded as solely "cosmetic" operations. Links make permanent changes to the HU.

There are several ways to link nodes:

**LINKING VIA DRAG & DROP**

Select a node. A red dot appears on the top left corner of the node. Click on the red dot with the left mouse button and drag the mouse pointer to the node that you want to link.

Release the left mouse button on top of the node.

If you link codes to codes or quotations to quotations, a list of relation opens consisting of the default relations plus the relations of the currently open projects.

![List of standard relations](image)
Select one of these relations. Now the two nodes are linked.

The two nodes are now linked to each other. In case of a first-class link between two codes or between two quotations, the relation name is displayed either within the link line, above the line (rotated) or within a box.

To set the display options, select Display / Link Display from the Network Editor’s menu.
TO LINK TWO NODES USING THE TOOLBAR ICON
- Select a node in a network view and click on the Link button in the toolbar (see left).
- A black line appears. Move the end on top of another node and left click.
- If you link two codes to each other or two quotations, then a list of relations pops up. Select one of the offered relations via a left click.

TO LINK TWO NODES USING MOUSE AND KEYBOARD
- Place the mouse pointer over the source node.
- Hold down the Shift key on your keyboard.
- Hold down the left mouse button and drag the mouse pointer to the target node.
- Release the left mouse button and the Shift key.
- Select a relation (applies to code-code and quote-quote links only).

TO LINK MORE THAN TWO NODES
If more than one source node is to be linked with a target node, use the following method.
- Select the source nodes (see “To select multiple nodes - method 1” on page 313).
- Choose Links / Link Nodes from the Network Editor’s main menu, or click on the Link button in the toolbar.
- Move the mouse pointer with the black lines to the target node and click the left mouse button.
- In case of code-code and quotation-quotations links, you are prompted to select a common relation that applies to all links. You can modify the relations later, if needed.

TO LINK CODE NODES USING THE LIST METHOD
Besides using the Network Editor for creating links between codes, you can also use the “Codes / Link Code to” option available from the main menu or the code context menu.
- Select the target code (i.e., the general, broader concept) in the Code Manager.
- Select Codes / Link Code to: / Codes from the main menu.
- Select the source code(s) from the multiple-choice list.
- Select a relation that links the selected codes with the target code. If needed, the relation can be modified.
An immediate effect of linking can be noticed when the Code Manager is open: the ‘density’ counter for all linked codes is updated.
As a reminder, **Density** counts all direct links to other codes. For instance, if six source codes are linked to one target code, the target code is incremented by 6; each source code is incremented by one.

**Using Codes / Link Code to**: From the HU Editor’s main menu, memos and quotations may also be linked to codes. Memos can also be linked to other memos, quotations, or codes via the menu option **Memo / Link Memo to**. However, no specific relation can be selected to link memos to other objects.

**TO CREATE CODE-CODE AND QUOTATION-QUOTATION LINKS USING THE OBJECT MANAGER**

Codes and quotations can also be linked in the Code / Quotation Manager via drag & drop.

1. Identify the target item in the Object Manager’s list pane.
2. Select one or more source items in the Object Manager’s list pane and drag them to the target item in the same pane.
3. Select a relation from the list of relations.

This option is only available for codes and quotations in the Code and Quotation Managers.

**Selecting A Link**

Only “first class” links can be selected. First class or “strong” links can only exist between quotations or between codes. Selecting links is similar to selecting nodes.

1. Move the mouse pointer onto the label of the link to be selected.
The mouse pointer changes its appearance.
Click the left mouse button.
The selected link label will be displayed inverted. All previously selected nodes/links are deselected.

Selecting links is a convenient way to cut or flip multiple links (see “Cutting Links” on page 318).

Deselecting Nodes And Links

To deselect a selected node or link: Hold down the Ctrl key on your keyboard. Click on a selected node or link.

To deselect all nodes and links: Move the mouse cursor over the Network Editor’s background. Double-click the left mouse button

Cutting Links

Several approaches to disconnecting previously linked nodes are available.
The first method works for all types of links and is useful when many nodes linked to one other node are to be disconnected:

Select one or more nodes whose connections to another node are to be removed.
Choose Links / Cut Links from the Network Editor’s menu or click on the Cut Links button in the toolbar.
Move the mouse pointer with the “rubber bands” to the target node.
Click the left mouse button

Alternatively:
Click on one or more link labels.
Choose Links / Cut Links from the Network Editor’s menu or click on the Cut Links button in the toolbar.

Or:
Move the mouse pointer over a link label.
Right click and choose Cut Link from the context menu.

The latter two methods work on “first class” links only: code-code or quote-quote (“hyper”) links.
Modifying Links

The type of a link (e.g., its Relation) can be changed in the Network Editor.

1. Right click on a link label and select Change Relation from the context menu.
2. The relation menu pops up. Select a different relation.

A very efficient way to manipulate first class links is offered by the Link Managers (see “Link Management” on page 336).

Selecting Neighbors

Neighbors are the nodes linked directly to a node. Using this procedure repeatedly selects a complete “connected graph”, which is a partial Network View where every node has a path (either a direct link or via intermediate nodes) to each other node.

To select neighbor nodes:

1. Select the initial nodes.
2. Choose Nodes / Select Neighbors from the Network Editor’s menu, or press Ctrl-N on the keyboard.
3. To mark a complete connected sub-network, repeat the previous step until all nodes within the partial Network View are highlighted.

Selecting Or Deselecting All Nodes

To select all nodes or deselect all selected nodes, select Nodes / De-Select all Nodes from the Network Editor’s main menu or press Ctrl-A on the keyboard.

INVERTING THE CURRENT SELECTION

To invert the current selection, press Ctrl-I or select Nodes / Inverse Selection from the Network Editor’s main menu. This will select all unselected nodes and deselect all previously selected.
Moving Nodes

By moving nodes to different positions, you can modify an initial layout created by the automatic layout procedure.

For precision placement of nodes, use the node alignment options from the network editor’s tool bar, or Select Layout / Align:

Do not forget to save the Network View (and the HU itself at the end of the session) if you want to make the new layout permanent.

TO MOVE A SINGLE NODE
- Move the mouse pointer onto the node to be selected.
- Hold down the left mouse button.
- Drag the selected node to its new position.

TO MOVE MULTIPLE NODES
- Create a multiple selection of nodes as described above.
- Hold down the Ctrl-key and drag the selected nodes to their new position.

TO MOVE NODES WITH THE ARROW KEYS
- Select one or more nodes using the selection methods described at “Selecting Nodes and Links” on page 313.
- Use the arrow keys in combination with the Ctrl key to move the node(s) 1 pixel at a time in all four directions.
Removing And Deleting Nodes From Network Views

Removing nodes from the view simply removes the nodes from the Network View. The nodes remain in the HU. Removed nodes can be “re-imported” at any time using the node import functions described previously. However, deleting nodes results in the deletion of the objects they represent from the entire HU—erasing codes, quotations, etc.! Be cautious when deleting nodes!

TO REMOVE NODES FROM A NETWORK VIEW

1. Select the nodes to be excluded from the view.
2. From the Network Editor’s main menu, choose Nodes / Remove Nodes From View or press Ctrl-Del on the keyboard. If you only want to exclude a single node, you may also choose this option from the node’s context menu.

TO DELETE NODES FROM A NETWORK VIEW

1. Select the nodes to be deleted permanently from your HU.
2. From the Network Editor’s main menu, choose Nodes / Delete Node.
3. Confirm the deletion process as it is a critical action. Deleting a node from a network view means that you permanently delete this object from your HU! This can be useful, when you have been adding new objects to a network view for exploratory purposes. Use this option with care.

For this operation, no undo option is available. The only way to undo a false deletion is to close the HU without saving it and to open the most recent version or backup.

Node And Link Actions

Commands affecting selected codes or links are available via their respective context menus. In addition, as described below, type-specific procedures are activated when double-clicking a node.
**CONTEXT MENUS**

Context menus can be activated on nodes and links. Dependent on the type of the node or link selected, these menus will offer specialized options from which to choose.

When the mouse pointer is over a node or a link, related information is displayed in the status window of the Network Editor.

To open a context menu, move the mouse-pointer onto a node or link and click the right mouse button.

![Figure 284: The status bar displays information about a node when moving with the mouse over it](image)

**CODE CONTEXT MENU**

![Figure 285: Context menus](image)

**TO EXECUTE NODE ACTIONS PER DOUBLE-CLICK**

1. Position the mouse pointer over a node.
2. Double-click the left mouse button

The table below describes the specific actions launched for the different node types.
If a comment or a memo’s text pops up, you can click inside the pop-up window to open a text editor.

<table>
<thead>
<tr>
<th>Node Type</th>
<th>Double-Click Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes</td>
<td>Displays the code comment (definition).</td>
</tr>
<tr>
<td>Memos</td>
<td>Displays the content of the memo.</td>
</tr>
<tr>
<td>Quotations</td>
<td>Displays the full text of the quotation.</td>
</tr>
<tr>
<td>Primary Documents</td>
<td>Displays the comment for the PD.</td>
</tr>
<tr>
<td>Families</td>
<td>Displays the description/comment for the family.</td>
</tr>
<tr>
<td>Network Views</td>
<td>Displays the description/comment for the Network View.</td>
</tr>
<tr>
<td></td>
<td>Hold down the Ctrl key to open this Network View in another Network Editor.</td>
</tr>
</tbody>
</table>

Saving A Network View

All links that you create are saved as soon as you save the HU file. You only need to save a network view, if you want to preserve the layout, i.e. the way you have arranged the nodes within the editor. If you do not save a particular view, you can always open up a network view on an object again and ATLAS.ti will arrange the objects according to the default or user-defined layout directions. For first-class relations, the user can defined preferred layout directions (see the section on the “The Relation Editors” on page 337.

To save a specific layout you have created, select the menu option NETWORK / SAVE AS.

Enter a name for the network view and click ok.

Accessing And Opening Existing Network Views

You can access saved network views via the network button that you find in the top left corner of the HU editor underneath the main menu, or via the Network View Manager, or via the navigation pane (see page 32).

VIA THE MAIN TOOL BAR

Click on the network button in the main tool bar:
Select a network and left-click to open it.

VIA THE NETWORK VIEW MANAGER

Select Networks / Network View Manager.

Similar to the primary document manager, the network view manager also offers a Tiles view with various preview sizes.

Select View / Tiles and then View / Preview Size: Jumbo. Or try out other sizes.
In the network view manager you can enter a comment for each network to describe it.

**VIA THE NAVIGATION PANE**

Open the navigation pane and select the network view tab:

Also here you have the option to display preview images:

Right-click and select Show Preview:
Analytic Functions

IMPORT NODE NEIGHBORS

This method imports all direct neighbors of the selected nodes into the Network View. This option is also available from the node’s context menu. Importing direct neighbors allows you to construct a connected Network View step-by-step. (In a connected graph, there is always a direct or indirect path between any two nodes.)

To import neighbors of selected nodes:

- Select the node(s) whose neighbors are to be included in the Network View.
- Right-click and select IMPORT NEIGHBORS from the context menu.
If you have mistakenly imported the wrong or too many node neighbors, select **Nodes / Undo Import Neighbors** from the menu, or press the key combination Ctrl-Shift-Z.

**Import common Neighbors** imports all directly linked objects. All other options let you specifically select which objects you want to import. Below the options for the various objects types are listed:

**Quotations**
- Import common Neighbors
- Import Codes
- Import Memos
- Import Hyperlinks

**Documents / Codes / Memos**
- Import common Neighbors
- Import Codes
- Import Memos
- Import Quotations
- Import Families

**Families**
- Import Neighbors (i.e. family members)

**CREATING CASE-BASED NETWORK VIEWS**

Importing a document’s codes neighbors allows to create case-based network views. You can ask questions like: Which of the codes have been applied in which document (and where do they not occur). ATLAS.ti automatically draws light gray lines between codes and the primary documents.

The network view “Hyperlink web looking at sources of happiness” in the Happiness Stage II sample project provides an example.
What can be seen is that statements that support the view that one is personally responsible for one’s own happiness are mainly coming from the blogs (P3 and P5). They contradict the view that relationships might be a source of happiness as well, which however is supported by scientific evidence (P10).

Another example provided by the sample project is the network view “Survey results for having / not having children by gender”.

**IMPORT CO-OCCURRING CODES**

For code nodes, there is a special import feature that exploits the spatial relations of different codings. A code co-occurs with another if it has been used to code quotations that are in close proximity: embedded, overlapping, or if two or more codes are applied to the same quotation.

The proximity of coding applied to a text can also be exploited via the Query Tool’s “co-occurrence” proximity operator. However, while the Query Tool yields quotations for explicitly specified codes, the import function brings in only the codes.

To import co-occurring codes:

- Select one or more codes in the Network Editor.
- Choose **Nodes / Import Co-occurring Codes** from the Network Editor’s menu.

**Working With Filters In Network Views**

In A7, filter settings do have an effect on network views. In previous versions if you used the import cooccurring code options, all cooccurring codes were...
imported. This resulted in pretty pictures but most often not in meaningful results. Being able to work with filters turns the network function into a powerful analytic tool.

Let's take a look at an example again based on the Happiness Stage II project:

To find out what people who have children and those who do not have children think about sources of happiness, do the following:

1. Add the code “#fam: have children” to a new network view.
2. Set the code family “Sources of happiness” as global filter (see “Setting a Global Filter” on page 56).
3. In the network view right-click on the inserted code and select the option Import Occurring.

Now only the “Sources of happiness” codes are imported. The links that you see between the codes have previously been created manually.

Repeat the steps with the super code #fam: don’t have children” and compare the outcome. To create the network view shown in Figure 293, two separate network views have been created at first. After the related codes were linked, all codes were added to one network view.

![Figure 292: Differences between parents and non-parents with regard to their views on sources of happiness](image)

**Use Global Filters To Fade-Out Objects**

If you set a global filter and click on the filter icon in the Network View editor, all objects that are not included in the filter are faded out. This is best demonstrated by way of example in the figures below:
In Figure 294 above the filter is set to the PD family “time period 2008” and thus only those quotations are shown that occur in primary documents from 2008. All other quotations are faded out.
In Figure 295 below, the reverse is true. You see all quotations from documents included in the PD family “time period 2009” and all other quotations are faded out.

![Figure 295: PD family filter is set: All quotations that are not from 2009 are faded out](image)

If you set other filters, e.g. a code family, then all but the codes of that family are faded out. This works for all filters in the same way.

**Create Families From Network Views**

You can create code, PD or memo families based on the nodes included in a network view.

- Select the nodes that you want to include in the family (see “Selecting Nodes and Links” on page 313).
- From the network editor’s menu, select the option **Specials / Generate Family** and then the respective object type (code, memo or PD family).
- Enter a name for the family and click OK.

**Create Network Views From Code Families**

It is also possible to create network views based on code families. A new code will be created from the code family name and all member codes will be linked via ISA relations.

- Open the Code Family Manager.
- Select a family and then the menu option **Families / Create Network**.
- A pop-up message informs you that a new code will be created and that all member codes will be linked via ISA relations. Confirm this message.
Accept the default name for the new code or enter a new one and click Ok. The newly created network view opens.

![Figure 296: A network view created from a code family](image)

**Layout Procedures**

Two methods are available for the automatic placement of nodes.

**Semantic Layout**

Places the nodes within the window using the *semantic layout algorithm*. This algorithm tries to place the nodes into optimal positions using an invisible matrix of default positions. It tries to place the nodes with the highest connectivity into center positions.

By recursively applying the same method to the rest of the nodes using neighboring positions of the first node placed, the algorithm tries to avoid overlapping nodes and too many crossing links. However, calculating an optimal solution is not possible in a reasonable amount of time.
The user can exert some control on this algorithm via the preferred layout direction of the relations used for the links, e.g., links using the “is-a” relation go from bottom to top, if possible. You can change the layout direction manually using the Relation Editor (see “The Relation Editor” on page 337 for details).

The results of the automatic layout procedure are typically quite usable and provide at least a good starting point for subsequent manual refinement of nodes’ placement. If you are not happy with the layout produced, you can revert to the previous placement by using **Undo Positioning** (Ctrl-Z).

**Topological Layout**

This special layout procedure tries to create a linear list of nodes positioned from the upper left to the lower right. This sequence is the result of a **depth first traversal** of the graph. The algorithm tries to resolve as many constraints between any two nodes so that a node with the least dependencies is made the first node positioned in the upper left corner, and the node with the most dependencies on other nodes is positioned in the lower right corner of the Network Editor.
In the example above, the dependencies between several activities necessary to get dressed are described by local constraints between the nodes. From these local constraints, a global solution is generated: One correct way to get dressed. The "is-cause-of" relation was used to describe constraints. The only condition a relation must meet is that it has the "transitive" attribute.

Such algorithms are typically in use in project management software. You can use a directed relation like "before" to represent time dependencies between events ("socks before shoes," "shirt before tie," "marriage before divorce") and then compute a possible sequence of events.
Creating Output

Several output options are available for Network Views. The range is from printing the layout (via copying to the clipboard in a variety of formats both textual and graphical) and by saving a Network View to a file.

Printing Networks

Before printing a Network View the first time, you may prefer to set some general options (include title, print border, etc.) (Specials / Preferences / Printing). You can either print the entirety or part of a Network View.

- Open the Network View and arrange all nodes to be printed.
- If you want to print a selection of nodes only, select these nodes (for multiple selection, hold down the Ctrl key).
- Choose Network / Print Network View from the Network Editor’s menu.
- In the Printer dialog window that opens, check “Selection” to print selected nodes only.

If the size of the network view determined by the node layout exceeds a single page, depending on current printer settings, scaling or multi-page print will be offered as a choice.

- Make your choice and the network view will be printed.

Network Views For Other Applications

COPY TO CLIPBOARD

The menu option Network / Copy to Clipboard copies the network view to the Windows clipboard. From the clipboard it can be included in Word or other “foreign” documents. The Network View (all nodes or selected nodes only) is copied to the clipboard in a variety of formats:

- A textual description of the contained nodes (a node synopsis)
- An Windows Enhanced Metafile for high quality graphics to be used in reports. Depending on the processing capabilities of the target application, results may sometimes be less than optimal.
- A bitmap file that has more accurate layout and fonts, but less quality when printed.

In other applications (Word, PowerPoint, etc) a selection or all of these formats are offered via Paste Special.
SAVE NETWORK VIEW AS GRAPHIC FILE

You can save your Network View as a graphic file, either as a bitmap (BMP) or as a Windows Enhanced Meta file (EMF). You can insert this file into reports, Word, PowerPoint, etc. Choose Network / Save as Graphics File.

This function does not save the network as a reusable structure for import to other HUs. In order to accomplish this, visit chapter “To export the code network” on page 345.

Link Management

The Code-Link and the Hyper-Link Managers (see page 359) offer a very efficient way to review and edit first class links (code-code links and quotation-quotation link, also referred to as hyperlinks).

Links can be edited, flipped, and removed, and a Network Editor can be opened on selected links, e.g., all nodes affected. A comment can be viewed and edited for the selected link. Last but not least, and typical for all Object Managers, links can be sorted by criteria such as the target or source object, the relation used, etc.

Changes made to the links are immediately displayed in any Network Editor that currently display the links.

The XML Explorer offers a number reports to export overviews and lists of the links you have created (see “Working with Style Sheets“ on page 393.

The Link Managers

The two figures below show a Code Link Manager and a Network View opened on two selected links. In the left figure the two links are selected and Flip Link from the context menu is selected. The right figure displays the effect.
The Relation Editors

The two Relation Editors, one for code-code relations and one for hyperlinks (quotation-quotation relations) allows the creation, display, and editing of relations. Explicit relations can only be used when connecting codes to codes or quotations to quotations. Connections between codes and quotations, memos and quotations, memos and codes, and families and their members cannot be named and specified by the user.

The relations editors already include a set of default relations. You can modify these entries at any time, translate them to your language, change the labels or the menu text, modify the line color, etc.
Cosmetic and descriptive as well as structural aspects of relations can be edited with the Relation Editor.

Cosmetics

Cosmetic aspects include the label used when displaying links in a Network Editor; the menu text displayed when creating a connection; and the width, solidity, and color of the line connecting the nodes linked with this relation.

Preferred Layout Direction

A more sophisticated “cosmetic” property is the preferred layout direction. By using this relation characteristic, the user can assert some control on the automatic layout algorithm. Indeed, this option justifies the name “semantic layout”.

Formal Property

The formal property associated with a relation has a cosmetic effect and it controls the “procedural semantics” of the semantic operators in the Query Tool. When you want to utilize the semantic operators (SUB, UP, SIB), transitive relations need to be used.

Figure 301: The Code-Code and the Hyperlink Relation Editors
Comment

As with all entities in ATLAS.ti, a comment can be attached to a relation. The text entered as a relation comment is displayed within a Network Editor after opening a context menu on a link, or when selecting **Display Relation**.

Bear in mind that a comment written for a relation is different from a comment written for a *link*. The comment for a relation is of a global nature and defines the relation type: e.g., what is meant by the relation “is associated with.” A *link* using this relation connects two specific codes. When writing a comment for this link, the meaning is local and explains why two codes were connected using this relation.

How To Edit Relations

The Relation Editor is available from the main menu **Network**, or can be launched from the Network Editor’s **Links** menu.

You can change the properties of relations. If these relations are already in use by the currently loaded HU, changes will be stored along with the HU when saving it.

1. Open the Relation Editor: **Networks / Edit Relations** and select whether you want to open the code-code or the hyperlinks relation editor.
2. In the list of relations, click on the relation to be edited.
3. Change any of the values.
4. Click on **Apply**.

If you open the Relation Editor from within a Network Editor, all changes are “broadcast” to the editor and you see the changes in the display of the affected links.

When opening the Relation Editor from the main menu, all but the preferred layout direction settings are realized immediately in all currently open Network Editors.

How To Create New Relations

User-defined relations are only available for code-code or quotation-quotation links. All other links use “hard-wired” relations (like the ones between quotations and codes).
New relations are stored together with the HU in which they are used. When starting ATLAS.ti 6, the default relations as defined in the file default.rel are loaded. This file is located in the user system folder that can conveniently be accessed via Tools / Explorer / User System Folder. When creating new relations, it is suggested that you save these relations to the default.rel file. If desired, different REL files can be created and loaded.

New relations can be created when linking codes or quotations, or independently of any linking activity. In both cases, entries are created with the Relation Editor.

When linking codes or quotations, select the option Open Relation Editor instead of one of the offered relations. Or, select Networks / Relation Editor from the main menu.

In the Relation Editor, select the menu option Edit / New Relation.

Enter a short unique ID for the relation you want to create. The default are capital letters, but it is not necessary to use capital letters. Just remember that each relation needs a unique ID. Based on this information, ATLAS.ti ensures that none of the relation is overwritten by any other relation.

Next, enter a label 1, a label 2, and a menu label.

In the Network Editor, you have three options to display the name of the relation (see Figure 303 below). As a view option, you can either display label 1, label 2, or the menu label. If there is sufficient space in the network, you can select to display the menu label, which is usually longer. Choose an abbreviation for labels 1 and 2 as a display option when space is limited.

![Figure 302: Relations](image)

![Figure 303: Display options for links in network views](image)
Choose a symbol for label 1, a short word for label 2 and a longer name for the menu label. Or: enter nothing for label 1, an English language name for label 2, and a label in your native language for the menu label.

The menu label equals the menu text. The text entered in the field 'Menu Label' is used in the relation menu and as a label. In addition, the menu text is also used when outputting networked codes in the form of quasi sentences (Codes / Output / Code Hierarchy or Code Neighbors).

Next select the line style (width, color, solid or dashed).

If you wish, you can specify the preferred layout direction that is used to automatically draw the picture when opening a Network View on an object.

The final attribute to enter is the "formal property" of the relation: "transitive," "symmetric," or "asymmetric."

A transitive relation is a directed link like “is part of”, “is reason for”, “is a”. Both symmetric and asymmetric relations are non-directed links. An example of a symmetric link is “is associated with”; “contradicts” is an example for an asymmetric link.

Optionally, you can describe the newly created relation in the text pane at the bottom of the Relation Editor.

In order to save the new relation, select File / Save from the Relation Editor menu. A file dialog window opens. The suggested file name is default.rel.

It is recommended to use this file as your standard repository for relations. It is possible to create different sets of relations by entering a new file name (see Managing Relations below).

Managing Relations

Using the Relation Editor, different sets of relations can be created and stored in separate files (using File / Save Relations). For instance, you could have a set of relations related to argumentation theory, or a set based on Grounded Theory relations. When starting ATLAS.ti, the default relation set is loaded (i.e., the file default.rel).

If you have created a new set and stored it in a new REL file, you need to load it after starting ATLAS.ti. To do so, open the Relation Editor and choose File / Load Relations. This adds the new relation set to the already loaded default set.

If you want to delete relations from the default set, or from any newly created set, select a relation in the Relation Editor and choose the menu option File / Delete Relation. When you have removed all unwanted relations and want to make the changes permanent, you need to save the set (select File / Save Relations).
Cosmetics - Network Display Properties

There are numerous options available to alter the appearance of nodes, links, and even the background.

However, all settings created using the Display menu of Network Editor are lost after closing the editor. If you want to change colors and fonts globally for all Network Views, you need to change these settings under Networks / Preferences.

Colors

You can set the Network Editor's background and the color of nodes. Choose Display / Set Colors (or click on the color circle in the tool bar) and then one of the options from the submenu. You are offered a standard color chooser dialog from which to pick a color.

If you have colored your codes, you can display these colors either as node label or as node color in a network view. To do so, click on the color circle in the tool bar and select the appropriate option:

If you have used a dark color to color a code, then use the “High Contrast” option to display the node label in white.

The option Color by Density & Groundedness visualizes the coding and modeling state of the codes. This mode affects code nodes only. Code nodes are automatically assigned a color according to their groundedness and density. Groundedness of a code (i.e., the number of associated quotations) increases the yellow part of the node color (note “name of suspect” in the figure below). Density (i.e., the number of links to other codes) increases the blue part (“name of suspect: Cohen” is the winner in the figure below). In the Code Manager, high-density codes are indicated in red, high frequency codes in blue.
This makes codes that are heavily or seldom used for coding or model building easily identifiable.

This Auto-Color-Mode has also an effect in the Code Manager in Details view:

The bars for groundedness and density are colored according to their frequency.

You can also activated the the auto-color option under the Views menu in the Code Manager.

Fonts

The font used for nodes and links can be set independently choosing Display / Set Fonts from the Network Editor’s main menu.

Display Of Nodes

Nodes can be displayed either in a flat or 3D-view, with rounded borders, with or without borders, and a gradient shading.

To select any of the four options, click on the Display button shown below.

Figure 306: Display options for nodes
Resizing Nodes

Nodes can be individually resized.

- Just left-click on a node and drag the node box into the desired position.

Node And Link Appearance

Under the Display menu of the Network Editor you find a large variety of options to alter the display characteristics of nodes and links. Some of these options affect all nodes regardless of their type. Other options change the display of certain node types only.

NODE ICON

The node type icon can be switched on and off for all nodes by selecting the menu option Display / Use Node Bitmaps, or by pressing the key combination CTRL-ALT-B. The small image used as a node icon increases the distinctiveness of the nodes, especially when a mixture of node types exists in a Network View. Nonetheless, when space runs low, you may prefer to switch off the icons.

A node can be displayed with a “3D” border, or with a drop shadow. To switch between the 3D and the shadowed view, select the menu option Display / Display Nodes 3D or press the key combination CTRL-3.

NODE VERBOSITY

You have several options to control the amount of information displayed in a node. Quotes can be displayed with just their ID or with the complete selection of text they represent.

![Quotation Verbosity]

Figure 307: Sub menu Quotation Verbosity

Of course, to decide which level of verbosity makes sense, you need to examine how many nodes populate the Network View and the overall size of the text.

- To change the verbosity of quotes, select the menu option Display / Quotation Verbosity.
Miscellaneous Network Procedures

Theory Transfer

By "Theory Transfer" we mean the re-use of codes, relations, and code networks produced in one project in subsequent projects.

Two different strategies are supported:

- The re-use of a "flat" (unstructured) list of codes including names, code definitions, author, date of creation and modification in other HUs.
- The transfer of rich representations of codes (including the connections between codes).

"FLAT" CODE MIGRATION

The first strategy--using unstructured code lists--includes the output of all or a selection of codes from one HU into a file and the later import of this code file into another HU. Step-by-step instruction is provided elsewhere (see “Transferring Codes from Other Projects” on page 197).

The method of flat code migration is useful when working in teams and when a code list is first developed on one computer. This way, other team members can easily import the agreed upon list of codes into their HUs. Other potential applications for this function include testing reliability, or starting deductive structural theory work from scratch. When testing for reliability, a given code base can be used on the same material by different authors.

SEMANTIC NETWORK MIGRATION

This method transfers a relatively complete "theory" into a new project. Like the flat code migration method described above, two steps are necessary. First, the network of codes needs to be exported and saved as an external file. Second, this file is imported into a new HU (or an existing HU).

TO EXPORT THE CODE NETWORK

- Load the HU that contains the "theory" you want to migrate.
- If needed set the code filter to contain only those codes to be processed in the next step.
- Choose PROJECT / EXPORT / CODE NETWORK from the HU Editor’s main menu.
- Enter a name for network file. By default, the name of the HU with the extension NET is offered.

The file contains a textual description, which can be processed by the import step described in the following directions.

TO IMPORT A CODE NETWORK

- Load the HU into which the network of codes shall be imported.
- Choose PROJECT / IMPORT / CODE NETWORK from the HU Editor’s main menu.
Select a network file (extension .NET).

CONFLICT RESOLUTION

When importing networks into an HU that already contains networked codes, the following internal strategy is applied to avoid conflicts: Existing codes and links are not modified, inconsistent links are not created (e. g. direct cycles).

CLEANING UP

While the situation of importing homonyms is controlled by the conflict resolution strategy, the system cannot automatically handle unwanted synonyms. Especially when importing codes and networks created by others into a non-empty HU, such synonyms (e. g., "man" and "mankind") might clutter the name space of codes. You can clean up by merging the synonyms (see “Merging Codes” on page 199).

SCALED THEORY TRANSFER

Besides the two strategies described above, you can use the HU merge procedure to gain more control over what components are to be transferred. Code lists with "rich" representations of codes can be extracted from a given "theory template" HU; Network Views, memos, and/or PDs may be included. This method also has the advantage that it is a "one-pass" procedure and there is no need to create extra files containing the codes or networks to be transferred. Unlike the Semantic Network Migration method described above, it also allows you to assert more control over how conflicts with existing codes and links are to be resolved.

For details please refer to “Merging Hermeneutic Units” on page 150.

MERGING CODES USING THE NETWORK EDITOR

Below we describe how merging codes can be accomplished in a Network Editor.

The figures below illustrate that the merging of two or more codes is not a trivial task, because all of their references, links, and comments need to be transferred to the target code in a consistent manner.

Using the network method is the "inverse" procedure of the list method described earlier (see “Merging Codes Using the List Method” on page 200). Using the list method, you select the target code first. Then you choose the codes to be merged. Merging codes in a network editor is the inverse. You select the codes to be merged first and then you select the target code.

TO MERGE CODES USING THE NETWORK EDITOR

Open or create the Network View that contains the codes to be merged (here "Magic 3", “Magic 7” and “Number magic”).

Select all "source" codes to be merged into one target code. Make sure that the target node is already visible in the Network Editor.
Choose **Nodes / Merge Codes** from the Network Editor's main menu.

Move the mouse to the target node and click the left mouse button.

![Diagram showing the merge of codes](image)

**Figure 308: Merging codes in a network view editor**

After the merge: The two former sub codes of "Number Magic" - "Magic 3" and "Magic 7" - have been merged into "Number Magic". All references to quotations, other codes, and memos have been "inherited" by "Number Magic".

The target node "inherits" all the references, i.e., quotations, links to other codes and memos, and comments, into the incorporated node(s).

**Network Views As Graphical Tables Of Contents**

If you use graphical PDs, you can use Network Views to display "thumbnails" (small-sized copies) of these PDs. See for example Figure 291.

Create a new Network View by choosing **Networks / New Network View** from the HU Editor's main menu.

- Import some graphical PDs (see "Nodes" on page 311).
- From the Network Editor menu, choose **Display / Full Image for PDs**.
- Rearrange the nodes in the Network View and save the network view.

You can configure the size of the thumbnails:

- Select **Specials / Preferences**, tab: **Nodes**. The standard width is set to 200.
- Change the width and click Apply. Close the Network Preferences window.

![Preference settings for thumbnail PDs](image)

**Figure 309: Preference settings for thumbnail PDs**
Hypertext

A network with text (or other media) as nodes is often referred to as a hypertext. The original sequential text is de-linearized, broken down into pieces that are then reconnected, making it possible to traverse from one piece of data to another piece of data regardless of their original positions.

The procedures described so far have focused on the creation of code networks. Direct linking of data-segments (quotations) to other data-segments offers similar flexibility in choosing and defining relations. Almost all of the editing functions described for code networks can also be used when connecting two or more quotations.

Code-code and quote-quote links are the only types of network connections that allow you to assign a name to the connection that appears on the line or arrow that runs between the objects.

Representing The “Rhetoric Of Text”

While a code offers fast access to sets of data segments, it defines only a simple relation between them, namely equivalence.

Hyperlinks, which directly relate data segments, express more differentiated relationships between quotations: contradiction, support, illustration, etc.

No code is needed to connect quotation Q1 with one that it contradicts (Q2). Cross-references between text passages are very common even in conventional media like books - just think of religious and juridical texts, literature, journals.
etc. Footnotes and endnotes are another common deviation from the pure linearity of sequential text. However, in conventional media, not much navigational support is provided for “traversing” between the pieces of data that reference each other.

Computer-related hypertext applications include, for example, online help systems that display operational information in suitable small chunks (compared to lengthy printed information), but with a considerable amount of linkage to other pieces of information. A well-known hypermedia structure is the World Wide Web with its textual, graphical and other multimedia information distributed world-wide.

Benefits Of Hypertext

What are the advantages of direct connections between text segments, compared to the traditional procedures of qualitative text analysis?

What Codes Cannot Do

Maybe we should ask a different question first: How can you express that statement X in text A contradicts statement Y in text B, or how can you retrieve all contradictory statements of a specific utterance if all you have is codes and their associations with the data?

The "code & retrieve" paradigm, which is so prevalent for many systems supporting the qualitative researcher, is not adequate for certain types of analysis. In formal terms, attaching codes to chunks of data creates named sets of segments with almost no internal structure. This is not to say that partitioning lots of text segments into sets is not useful. On the contrary, classification leads to manageable amounts of segments that later can be retrieved with the help of the attached code words. But this may not be the only way you want to look at your data.

The concept of hypertext introduces explicit relations between passages. These links have to be built manually and result from an intellectual effort. The system cannot decide for you that segment x is in contradiction to segment y. But after the work of establishing the links, you can make semantically richer retrievals: “Show statements contrary to statement x.” Hypertext allows you to create different paths through the data you are analyzing. For example, you may create a timeline different from the strict sequence of the original text.

Graphical Hyperlink Maps

ATLAS.ti incorporates procedures for creating and browsing hypertext structures. It allows for two or more quotations being connected using named relations. Further, you can create graphical maps (using Network Views) to make parts of your hyperspace accessible in a comfortable way. Hyperlinks may connect quotations (textual, graphical, multimedia) across documents (inter-textual links) or may link segments within the same primary document (intra-textual links). The natural boundary for hyperlinks, like all structures in ATLAS.ti, is the Hermeneutic Unit.
The hypertext Network View to the right displays quotations in maximum "verbosity" set to "full text." Other node types can also be included in the Network View, like the memo in the upper left corner.

Figure 311: A network of quotations

General Procedures

STAR OR CHAIN CONNECTIONS

When linking quotations, you have the option to create a “chain”, a “star” or a combination of both. Below, a chain and star connection are illustrated.
When creating this chain, the quotation 2:3 served as a source quotation and was linked to the target quotation 3:5. In order to continue the chain, the target quotation 3:5 became the source quotation and was linked to the new target quotation 8:7.

A hyperlink star connects many quotations from one source quotation:

When creating a star, there is one source quotation and multiple target quotations. In the above example, the source quotation is 8:6, which is linked to five target quotations via a number of different relations.

Hyperlinks In The Quotation Manager

All hyperlinked quotations can easily be recognized in the Quotation Manager. All source quotations are marked with an opening angle bracket <, all target quotations are prefixed with angle brackets.
quotations with a closing bracket >. If a quotation is both, source and target (as the case when creating chains), then both brackets are used as prefix <>

Hyperlinks In The Margin Area

When working with hyperlinks, it is advisable to set the margin display options as follows:

Creating Hyperlinks

ATLAS.ti offers a variety of options for creating and traversing hypertext links. Similar to the linking of codes, you may create hyperlinks in a the Network View editor (see “Linking Nodes” on page 314). In addition, hypertext links can be created "in context", or via Drag & Drag in the Quotation Manager and in the margin area.
Creating Hyperlinks Using The Context Menu

TO CREATE A CHAIN:

1. Select a data segment as source or an already existing quotation.

   Right click on the selection or the quotation and select the option **CREATE LINK SOURCE** from the context menu. Alternatively, you can click on the **Source Anchor** button in the primary document toolbar.

2. Select a target segment or an existing quotation as target, right click and select the option **CREATE LINK TARGET** from the context menu. Alternatively, you can click on the **Source Anchor** button in the primary document toolbar.

   If you select a data segment as source or target that was not yet a quotation, ATLAS.ti automatically creates a quotation from it.

   A list of relation pops up. Select a relation to link the two selected quotations. If none of the existing relations fit, create a new relation by selecting **OPEN RELATION EDITOR** (see “How to create new relations“ on page 339).

   ![Figure 316: Select a relation to link the source with the target quotation](image)

   Select the option **CHAIN** to link a next data segment to the current target quotation. Select **Fini** to end the chain.

   ![Figure 317: Select "Chain" to link another quotation to the current target quotation](image)
TO CREATE A STAR:

Proceed as explained above “To create a chain:”, but select the option Star. Then the next quotation is linked to the current source quotation. For your information, the quotation IDs for the current source and target quotations are listed in the menu.

Creating Hyperlinks In The Quotation Manager

This method can be applied to connect one or more existing quotations to one target quotation.

- Select one or more source quotations in the Quotation Manager (multiple selections can be done in the standard way).
- Hold down the left mouse button and drag the quotation(s) to a target quotation in the Quotation Manager.
- Release the left mouse button. The Relation menu opens and you can specify the relation to be used for the hyperlinks.
- The new hyperlinks are then created.

Creating Hyperlinks In Margin Area

Like the method described above, creating hyperlinks in the margin area is best suitable for connecting two quotations that are in close proximity to each other.

- Select a quotation bar in the margin area.
Hold down the left mouse button and drag the bar onto another quotation bar.

Release the left mouse button. The Relation menu opens. Select a relation. The linking procedure ends here.

Dropping a bar onto another quotation displayed alongside a bar, replaces the existing hyperlink.

Utilizing The Multi-Document View For Hyperlinking

The multi-document view makes it easy to set hyperlinks.

Load two documents side-by-side.

Left click a quotation bar in the active region, drag the mouse to a quotation bar in the same or a neighboring region, release the left mouse button and select a relation (see Figure 319 below).

If you double-click on a hyperlink, a window pops up providing information on the linked quotation and you can click inside to visit this quotation. Or use the short-cut Ctrl + double-click to immediately jump to the linked quotation. ATLAS.ti loads the document containing the linked quotation into the neighboring region and you can view the linked segments side-by-side (see also “Traversing Hyperlinks” on page 356).

Modifying Hyperlinks

There are two place to modify existing hyperlinks, the Network Editor and the Hyperlink Manager (see “Link Management” on page 336).
TO MODIFY LINKS IN THE NETWORK EDITOR

- Open a network view on a hyperlinked quotation (e.g., by right clicking on a quotation and then selecting the option **Open Network View** from the context menu).
- In the Network Editor, right click on a link label and select **Change Relation** from the context menu.
- The relation menu pops up. Select a different relation.

Defining New Hyperlink Relations

The procedure for defining or editing hypertext relations is equivalent to the methods described for editing code-code relations. You may either define a new relation by choosing the bottom option from the list of relations when actually creating a link, or you may use a hyper-links relation editor, that is identical to the code-code relations editor (see “How to create new relations” on page 339). Newly defined or edited relations must also be saved to disk.

Traversing Hyperlinks

Media-type quotations can be distinguished easily by their icons. These icons may be used in the margin area, the Object Manager, the HU Explorer, the Crawler, and in Network Views. The figure below shows the media types of hyperlinked quotations in the margin. From top to bottom these are: text, video, audio, image and Google Earth hyperlinks.

**Figure 320: Media types for hyperlinks**

TO TRAVERSE HYPERTEXT LINKS USING THE MARGIN AREA

- Switch on the margin area.
- If needed, open up the properties context menu in the margin area and select **Object Types / Hyper-Links**.
Double-click a hyperlink displayed in the margin. The quotation to the left of the margin area is highlighted and a pop-up window displays the hyperlink’s contents.

To display the hyperlink in context, click into the pop-up window. Clicking outside the pop-up window cancels the process.

You can also use the short-cut Ctrl + double-click to immediately jump to the linked quotation.

Useful Options For Hyperlinks And Quotations In The Network View Editor

To move to the text of a quotation that appears in a network, right click over the quotation node and choose Display in Context. You are moved to the section of the Primary Document where the quotation resides.

To IMPORT THE NEIGHBORS OF A QUOTATION

The Network Editor lets you import the neighbors of selected nodes by choosing Import Neighbors from the Network Editor’s Node menu (see description in section “Import Node Neighbors” on page 326). Importing the neighbors of a quotation, that is part of a hypertext, not only retrieves linked objects of type “quotations” but also yields all codes, memos and other quotations directly connected to it.

To reduce clutter by only importing neighbors that are quotations, and not codes, memos or documents, hold down the Ctrl key when selecting the option from the Network Editor’s menu. If you want the neighbors of only one quotation imported, open the context menu of this quotation and choose Import Neighbors.
Editing Hyperlink Comments

The links between quotations use fully qualified relations, like the links between codes and unlike the simple association between a code and a quotation. As “first-class” objects, these links can be assigned a dedicated comment. Such a comment could explain why quotation A has been linked to quotation B. Link comments can be accessed, displayed and edited from three locations: the margin area, the Hyperlink Manager and the Network Editor.

The margin area has the advantage that it is readily available during scrolling through the primary documents. The Network Editor method offers a visual approach to accomplishing this goal. Create a network view of the hypertext nodes to facilitate this process.

TO EDIT A HYPERTEXT LINK COMMENT USING THE MARGIN AREA

1. Switch the margin area on. If not already selected, open up the properties context menu in the margin area and select Object Types / Hyperlinks.
2. Pop-up the context menu for a hyper link displayed in the margin. The quotation inside the primary document pane is highlighted at the same time.
3. Choose Edit Link Comment.

TO EDIT A HYPERTEXT LINK COMMENT USING THE HYPERLINK MANAGER

1. Open the Hyperlink Manager via Networks / Hyper-Link Manager from the HU Editor’s main menu.
2. Select a hyperlink.
3. Edit the comment in text pane below the link list, or open a text editor by clicking the Editor button.

Figure 322: Commenting on a link
TO EDIT A HYPERTEXT LINK COMMENT USING THE NETWORK EDITOR

Open a Network Editor on a quotation establishing one end of the hypertext link.

Move the mouse pointer onto the link between two quotations and open the context menu with a right mouse button click.

Choose Edit Comment.

The Hyper-Link Manager

The Hyper-Link Manager works exactly like the Code-Link Manager, only that it is populated by hyperlinks.
When double clicking a link a pop-up menu is shown. You can choose to display the source or target quotation. The content of the linked quotation is then shown in a pale yellow window. If you click into this window, the linked quotation is shown in context.

Use the XML Explorer to create a report of your hyperlinks (see “Working with Style Sheets” on page 393).

CREATING NEW RELATIONS FOR HYPERLINKS

The Relation Editor has already been discussed in the context of code-code links (see “The Relation Editors” on page 337). The relation editor window for hyperlinks looks the same and can be handled in the same way as the relation editor for code-code relations. It only displays a different set of relations. To open it, select NETWORKS / EDIT RELATIONS / HYPERLINK RELATIONS from the main menu.