Ontology Visualization

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What is the graph widget?

- Allows visual editing of instances and relationships between instances
- Alternative to Protege’s “Forms” for entering instance data
When is the graph widget appropriate?

- When instances are connected through slot values (e.g., a linked list).
- When instances connected by instances of the "\texttt{DIRECTED-BINARY-RELATION}" system class.
When is the graph widget appropriate?

- Speeds knowledge acquisition in ontologies with heavily interconnected concepts.
- Helps convey meaning and organization of acquired knowledge.
- Data that resembles process diagrams, flow charts, organizational charts.
Open the “GraphWidgetExample” project

Select the “Organization” class
Notice the "organization_chart" slot, which is the slot that we will configure to use the graph widget.
Configure the “organization_chart” slot to use the graph widget.
How do I optimize size for the graph widget?

- Double-click on the Form background (anywhere without a widget)
- Use the Layout tab to fill horizontal and vertical space
How do I configure node appearance?

- Double-click on the organization_chart slot to bring up the widget configuration dialog.
How do I configure node appearance?

- Use the “General” tab to change the label or tooltip for the “organization_chart” slot.

- Use the “Nodes” tab to assign shapes, colors, and text properties to nodes.
Configure simple connectors

- Graph widget has two connector types, one of which is a “simple connector”

- Simple connectors have no underlying instances
Select the Editor class

Notice the “responsible_for” slot, which will be the simple connector
Configure simple connectors

- Choose connector slot for Editor class in widget configuration dialog
Drag and drop nodes to create instances of employees – draw connectors to fill in slot values.
Graph widget UI tips

- Click on node labels to drag nodes
- Nodes are resizeable
- Double-click node labels to rename
- Right-click connectors to insert points
- Automatic layout provided
- Save graph as image
Graph widget UI tips

- The graph widget only allows you to draw *valid* connectors between nodes

- You *can* add pre-existing instances to the graph widget
Configure reified relations

- Reified relations are the second connector type offered by the graph widget
- Allows storage of additional information about a relationship between two nodes
Notice subclasses of the :DIRECTED-BINARY-RELATION class, which will be our reified relations in the graph widget.
Notice the slot that has been designated to hold instances of reified relations.
Configure reified relations

Use the reified relations tab to configure the relation slot, line types, colors, arrowheads, etc.
Example of reified relations between instances of the Employee class.
Graph widget UI Tips

- Double-click on complex links to bring up instance forms

- Designate display slots for subclasses of `:DIRECTED-BINARY-RELATION` to enable editing of connector labels
Larger scale visualization

- OntoViz Tab – visualize ontologies with GraphViz
- OWLViz Tab – Visualize OWL ontologies with GraphViz
- Jambalaya – visualize ontologies with SHriMP (Simple Hierarchical Multi-Perspective)
- TGViz – visualize ontologies with TouchGraph
OntoViz Tab: helper documentation for tab abbreviations…

- sub = subclass closure
- sup = superclass closure
- slx = slot extension
- isx = inverse slot extension
- slt = slots
- sle = slot edges
- ins = instances
- sys = system frames
OntoViz Tab

Use the "Options" button to configure graph

Use the "add class" button to choose a class to graph
Click the “Create Graph” button to generate graph.
Demo: OWLViz Tab

- Designed specifically for use with the Protégé-OWL editor.
- Allows comparison of asserted and inferred class hierarchy.
  - Computed changes to hierarchy are clearly visible.
  - Inconsistent concept are shown in red.
Demo: Jambalaya Tab

- Uses SHriMP (Simple Hierarchical Multi-Perspective)

- SHriMP is designed to help people browse complex information spaces

- Upside: very feature rich

- Downside: bigger learning curve than other tools

- Documentation/tutorials: http://www.thechiselgroup.org/jambalaya
TGViz Tab

- Utilizes TouchGraph (renders networks as interactive graphs)
- TouchGraph uses “Spring Layout”
- PubMed uses TouchGraph to visualize graphs of related documents in medical libraries
Use the “add class” and “add instance” buttons to add items – click the “create graph” button to graph.