Professional Quality Graph Layout for GEF

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Overview

- What is Graph Layout
- What is the Eclipse Graphical Editing Framework
- The GEF Graph Layout Architecture
- Layout in the View
- Layout in the Model
- The ILOG JViews Graph Layout Architecture
- Professional Graph Layout
- Demos
What is Graph Layout

- Graph:
  - Node, Vertex
  - Edge, Link, Connection
  - Nested Graph

- Graph Layout:
  - Compute Automatically Node Positions and Edge Routings
    - Aesthetically: symmetry, avoid crossings and overlaps, ...
    - Domain specific: Pert Chart layout, Org Chart layout, ...

first demo
Eclipse Graphical Editing Framework

- GEF = Graphical Editing Framework
  - Eclipse Tools Project, by Randy Hudson, e.a.
  - http://www.eclipse.org/gef/
- MVC Toolset for building Graph Editors

![Diagram showing Model, Controller, and View/Drawing components with arrows indicating listen, create/update, and persistent connections.](Diagram)
GEF Graph Layout Architecture

- GEF Graph Layout Algorithms are part of Draw2D
GEF Graph Layout Architecture

- GEF Graph Layout Algorithms are part of Draw2D

Diagram:
- Model
- Edit Part
- Command
- Update Manager
- Layout Manager
- Figure
- setBounds

You need to write:
- Edit Part
- Layout Graph
- Layout Graph Translator
- Graph Layout Algorithm
- Figure Position Updater
• Disadvantages
  ✦ API on Graph Layout not uniform
    ▪ Different layout graph data structures for different layouts
  ✦ Too much work for you (the developer)
    ▪ EditPart to Layout Graph Translator
    ▪ Figure Position Updater
  ✦ Not integrated in the data model
    ▪ Not persistent
    ▪ Not based on commands
    ▪ Not undoable

=> We can make it simpler & more powerful
Layout in the GEF View

- Lots of stuff is standard => hide it!

JViews Graph Model

- Edit Part
- Layout Graph
- Translator
- Position Updater
- Graph Layout Algorithm

Edit Part

Figure
Layout in the GEF Model

- Work on commands => undo & persistence support

JViews Graph Model

- Edit Part
- Command
- Edit Part To Layout Graph Translator
- Layout Graph
- Position Updater
- Graph Layout Algorithm
Layout in the GEF Model

- JViews Graph Model based on Commands
  - Undoable & Persistent
  - Supports Autolayout
  - Supports Nested Graphs
  - Compliant with GMF

JViews Graph Model

Graph Layout Algorithm

via Requests

Edit Part

Command

Model

XYLayout

Figure
Layout GEF Requests

The JViews Graph Model relies on the GEF Requests

- `REQ_MOVE (node)`
- `REQ_RECONNECT_SOURCE (end point)`
- `REQ_RECONNECT_TARGET (end point)`
- `REQ_SET_ALL_BENDPOINTS (bend point)`

https://bugs.eclipse.org/bugs/show_bug.cgi?id=213171
Move from GMF to GEF

- `REQ_SIZE (nested graph)`
ILOG JViews Graph Layout Architecture

• Various Predefined JViews Graph Model
  ✷ Ready to use, no work, no overhead
  ✷ All tricks are automagical

• Various Graph Layout Algorithms
  ✷ Work directly on graph models
  ✷ Work for flat and nested graphs
  ✷ Large set of parameters for different application domains
  ✷ Layout constraints

=> Makes the Usage of Graph Layout really easy
Professional Graph Layout

- Professional graph layout must scale in performance and quality

![Graph Size vs. Layout Time](chart.png)

- Different layout styles
  - Hierarchical Layout
  - Tree Layout
  - Link Layout
  - Uniform Layout
  - Circular Layout
  - Bus Layout
  - Grid Layout
  - Topological Mesh Layout

- Autolayout
- Layout of nested graphs
Demos
Demos
Thank You!

More info about JViews Graph Layout for Eclipse:

Code Examples & Eclipse Plugin Templates:

(The directory is invisible, but the direct access to the file works)