Vector Graphics Drawing How-to

Draw scalable vector graphics in displays.

Overview

This guide walks you through creating precise vector graphics using polylines, polygons, and the new spline curves feature. Learn to draw custom shapes, import SVG graphics, and use advanced drawing techniques for professional process graphics.

Prerequisites:

- Basic understanding of the Draw environment
- Familiarity with selection tools
- Knowledge of display creation

Understanding Vector Drawing Tools

Available Shape Tools

Tool	Purpose	Drawing Method
Rectangle	Basic shapes, containers	Click and drag
Ellipse	Circles, rounded elements	Click and drag
Polygon	Closed multi-point shapes	Click points, close to finish
Polyline	Open paths, piping	Click points, Enter to finish
Spline Curves	Smooth curved paths	Click control points

Drawing Modes

- **Click-and-drag**: For rectangles and ellipses
- **Point-by-point**: For polylines and polygons
- **Direct manipulation**: Edit points after creation

Drawing Polylines (Piping and Connections)

Creating a Polyline

1. Select **Polyline** tool from left toolbar
2. Click to place first point
3. Click to add subsequent points
4. **Press Enter** or **right-click** to finish
5. **Press Esc** to cancel

Tips for Piping Diagrams

- **Hold Shift** while clicking for straight horizontal/vertical segments
- **Use grid snap** for aligned piping
- **Double-click** last point to auto-close to first point

Editing Polyline Points

Using the **Direct Selection Tool** (black arrow):

- **Move point**: Click and drag any point
- **Add point**: Double-click on line segment
- **Delete point**: Right-click on point
- **Convert corner**: Alt-click on point (smooth/sharp)

Creating Polygons (Closed Shapes)

Drawing Custom Equipment Shapes

1. Select **Polygon** tool
2. Click to place vertices
3. Shape auto-closes when clicking near start point
4. Or press Enter to auto-close

Example: Tank Shape

```
1. Draw hexagon base (6 clicks)
2. Use Direct Selection to adjust points
3. Apply fill color for liquid level
4. Add Bargraph dynamic for animation
```

Using Spline Curves (New Feature)

Creating Smooth Curves

Spline curves create smooth paths through control points:

1. Select **Spline** tool from toolbar
2. Click to place control points
3. Curve automatically smooths between points
4. Adjust tension for curve tightness

Best Uses for Splines

- **Flow lines** with natural curves
- **Organic shapes** like rivers or borders
- **Smooth transitions** between equipment
- **Decorative elements** requiring fluidity

Spline vs Polyline

Feature	Polyline	Spline
Path type	Straight segments	Smooth curves
Control	Direct points	Control points
Use case	Piping, straight paths	Natural curves
Editing	Move vertices	Adjust curve tension

SVG Image Importer

Importing SVG Graphics

1. Go to **Displays Images Click "Add +" or "Import a File"**
2. Select your SVG file and click Open

Editing Imported SVGs

When adding an SVG image into the Draw environment, if you double click it, you will have all the reference points of the file that can be edited as needed

SVG Best Practices

- **Clean SVG files** before import (remove unnecessary groups)
- **Check scale** - adjust to display units
- **Simplify paths** for better performance
- **Test dynamics** on individual elements

Connecting Shapes with GridLines

Creating Connected Diagrams

1. Enable **Connections** property on shapes:
    - Select rectangle/ellipse
    - Check "Connections" in properties
2. Draw GridLine between shapes:
    - Select GridLine tool
    - Click on first shape edge
    - Click on second shape edge
    - Line auto-routes
3. Move shapes - connections follow!

Connection Properties

- **Auto-routing**: Finds best path
- **Orthogonal**: Right-angle segments only
- **Direct**: Straight line connection

Combining Shapes

Boolean Operations

Use toolbar buttons to combine selected shapes:

Operation	Result	Use Case
Union	Merges shapes	Complex equipment
Intersect	Overlap only	Cutouts, windows
Exclude	Remove overlap	Hollow shapes
Exclusive-Or	Non-overlap parts	Frames, borders

Example: Creating a Valve Symbol

1. Draw circle (valve body)
2. Draw triangle (flow direction)
3. Select both **Union**
4. Add rectangle (stem)
5. **Union** again
6. Apply dynamics to combined shape

Display Save Shortcuts (New Feature)

Quick Save Options

New keyboard shortcuts while saving:

Shortcut	Action	Use Case
Ctrl+S	Save + Open XAML	View/edit raw XAML
Shift+S	Save + Show tag usage	Audit tag references
Alt+S	Save + Preview mode	Test without running

Using XAML View (Ctrl+S)

Opens Notepad with display XAML:

- Search for specific elements
- Bulk find/replace operations
- Copy complex structures
- Debug binding issues

Tag Usage Report (Shift+S)

Shows all tags used in display:

- List of referenced tags
- Dynamic connections
- Missing tag warnings
- Cross-reference tool

Advanced Drawing Techniques

Creating Reusable Pipe Segments

1. Draw standard pipe section with polyline
2. Add standard width and color
3. Save as symbol: "Pipe_Horizontal"
4. Create variants: "Pipe_Vertical", "Pipe_Elbow"
5. Build diagrams by combining segments

Using Layers (Z-Order)

Control what appears on top:

```
Background shapes  Send to Back
Piping  Middle layer
Equipment  Default layer
Labels/Values  Bring to Front
```

Grid and Snap Settings

For precise technical drawings:

1. Click **Grid Definition** button
2. Set grid spacing: 10 pixels
3. Enable **Snap to Grid**
4. Show **Rulers** for measurements

Performance Tips

Optimizing Complex Drawings

- **Combine static shapes** using Union
- **Limit polyline points** - use minimum needed
- **Group related elements** for easier selection
- **Lock background elements** to prevent accidental moves
- **Hide complex elements** while editing others

Managing Many Shapes

When working with 100+ shapes:

- Use **layers** effectively
- **Group by system** (cooling, heating, etc.)
- Create **symbols for repeated elements**
- Use **Hide/Show** during editing

Troubleshooting

Polyline won't close

- Click near first point (within 5 pixels)
- Or press Enter to auto-close
- Use Polygon tool if always need closed shape

Can't edit imported SVG

- Must convert to shapes on import
- Ungroup after import

- Some complex SVGs may need simplification

Connections not following shapes

- Ensure "Connections" enabled on both shapes
- GridLine must start/end on shape edges
- Try deleting and redrawing connection

Spline curve too complex

- Reduce number of control points
- Adjust tension settings
- Consider using polyline for simpler paths

This guide covered creating and editing vector graphics in displays, from basic polylines to advanced spline curves and SVG imports, enabling professional technical drawings and process graphics.

In this section...
