Proper Choice of Graphics Formats

Never throw away essential information.

1. *Never convert vector to raster data.*
2. *Never use lossy compression on line graphics.*

The proper choice of graphics formats during processing and publishing has a critical impact on the quality and usability of the result. The two principal issues are:

1. Preservation of information (in particular, **resolution independence** and avoidance of **compression artifacts**)
2. Minimization of **file size**

The most important distinction is between vector (resolution independent) and raster (pixel) data. From this follows Rule Number One: *Never convert vector data to raster data.*

Then, file formats require attention because of the technological restrictions imposed by the publishing medium.

Vector Data (possibly combined with raster data)

1. Never convert them to raster format.
2. For **print** publishing: For PDFLaTeX, convert your graphics to (vector-format) PDF. For legacy, DVI/PostScript-based LaTeX processing chains, convert your graphics to (vector-format) EPS. Many XML formatters, including FOP, support SVG. [1]
3. For **Web** publishing: Use SVG. For legacy browers that do not yet support SVG, for maximum portability you may want to offer an alternative raster image (inside an `<object>` tag, for example), see below.

Raster Data

1. Keep your graphics files reasonably small. Provide the resolution required for high-quality publishing, but do not preserve more than can be reproduced in the published form.
2. If your data are composed of **smooth transitions** (typically, this includes all **photographs** and almost nothing else): Use a **lossy** format enabling a high compression rate at almost no visible loss of quality (JPEG/JFIF).
3. If your data contain **discrete colors, drawings** etc. (this includes most non-photographic data, or photographic data with line graphics overlaid): Use a **lossless** format. PNG is highly recommended as it is open, includes compression, and is widely supported[2]. For discrete-color drawings, it yields better compression ratios than JPEG, at perfect quality, while JPEG creates approximation artifacts that are particularly obnoxious in print. [3]

Recommended Graphics Formats

Format		Vector	Raster	
			lossless	lossy
Portable Document Format	PDF	•	•	•
Scalable Vector Graphics	SVG	•	•	•
Portable Network Graphics	PNG		•	
JPEG File Interchange Format	JPG, JPEG, JFIF			•

Conversion

There are open-source tools for essentially all conversions that arise in practice. To convert PDF to SVG I recommend Inkscape.

[1)]

OpenOffice.org can import PDF, SVG and other vector graphics formats. I'm sure some of its proprietary look-alikes can also be convinced to grok vector graphics.

[2)]

Except for alpha-channel transparency by Microsoft products, but perhaps this information is outdated.

[3)]

There is almost no reason to use GIF anymore, as PNG is much more versatile and often more efficient. Exceptions are alpha-channel transparency for use with Microsoft products (well supported by the open-source community however) and animated raster graphics (MNG is still not very widely supported).

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