

The Digital Image Defined

A bitmapped digital image is composed of a set of dots or squares, called **pixels** (from *picture elements*), arranged in a matrix of columns and rows. Each pixel has a specific color or shade of gray, and in combination with neighboring pixels it creates the illusion of a **continuous tone** image. This matrix is created during the scanning process, in which an analog original is **sampled** at regular intervals, or the color of selected points of its surface, corresponding to each pixel, is recorded. Generally speaking, the more **samples** taken from the source image, the more accurate the resulting digital surrogate will be. Digital image files are commonly divided into "master" and "derivative" versions. **Master files** are the highest quality files available, usually the originals created by the sampling process. It is from these that further copies of the images are derived, and often manipulated, to create lower-quality and more easily distributed **access files**.

Digital files do not have any independent material existence; rather, they exist as data or binary code until they are rendered by intermediary technology: application software running on a given operating system running on a particular hardware platform. One effect of this is that digital image files are particularly vulnerable to format obsolescence and media decay, and, therefore, ensuring the longevity of digital images can be complicated and costly. Another effect is that a single digital image may manifest itself differently in different circumstances according to a number of variables. Finally, digital images cannot be directly located or searched; this must be done indirectly through the information that describes them—their metadata—created either manually or with automatic **indexing** software. A digital image not associated with metadata will be difficult to find or identify and is likely to become useless very quickly. In fact, in order for data (in this case, the content or "essence" of a digital image file) to have continuing value and to be worth preserving, both it and its related metadata should be managed as a single entity, sometimes known as a **digital object** or a digital asset.