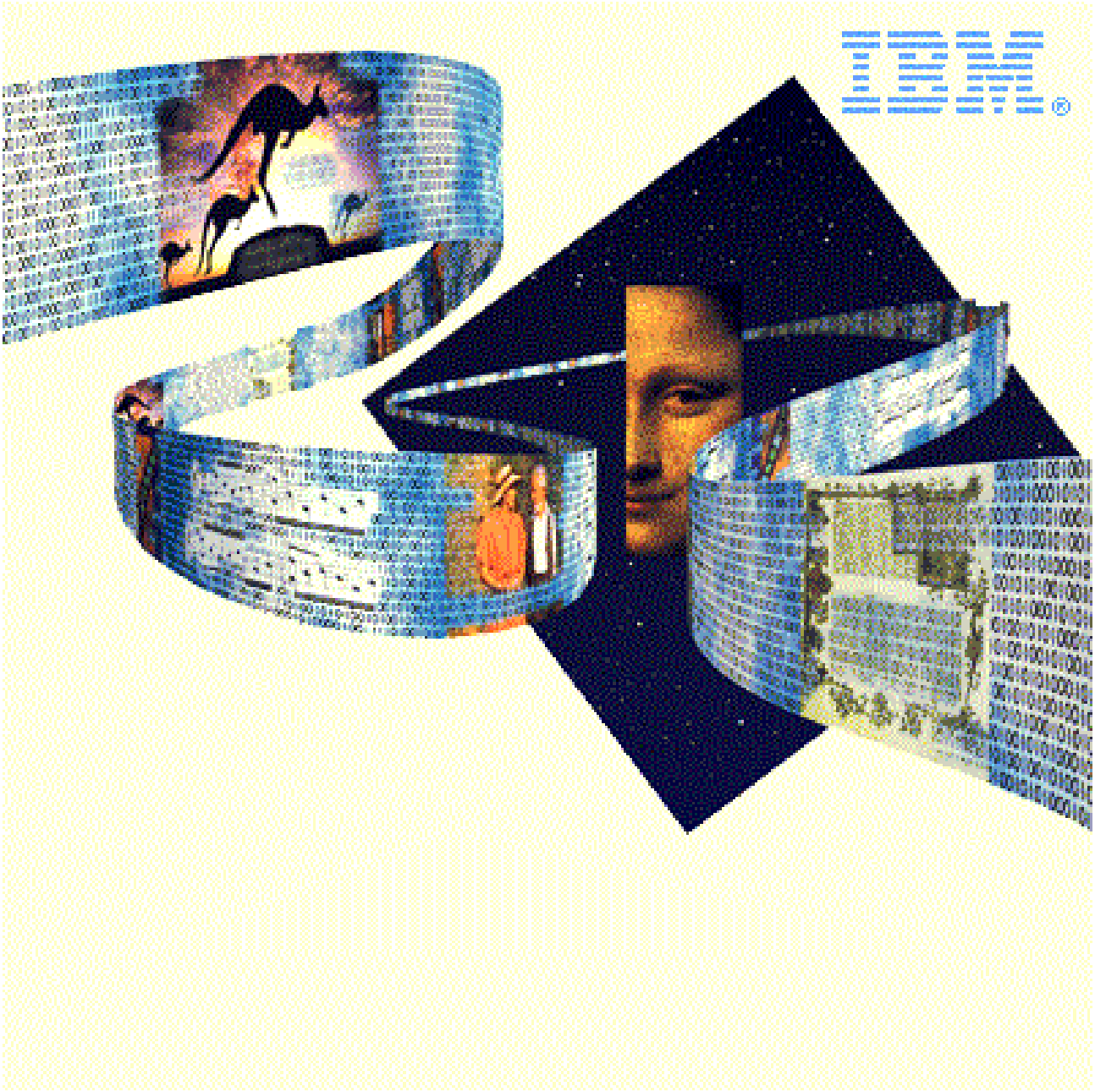

IBM Digital Library

Collection Treasury Solution

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Overview

The IBM Digital Library Collection Treasury Solution (CTS) is a system designed especially for museums, libraries, and similar archival institutions that have special, non-portable collections to which a wide variety of users need to make visual references quickly and easily. DLCT can be generalized to fit the needs of any institution having the need to store and access images. This solution accomplishes all of this by creating and storing digital records of books, manuscripts, photographs, artwork and other cultural artifacts. It also provides a way to manage these items of information efficiently by storing them along with appropriate descriptive information, known as metadata by which they can be accessed. In addition, it provides protection for these assets while enabling them to be more accessible to wide audiences through applications such as on-line museum exhibits as well as various educational applications.

The IBM Digital Library Collection Treasury Solution is built upon IBM Digital Library, which is an open integration of hardware and software components. This solution expands on these components by providing additional components appropriate for the museum and library industry. It provides the means for an institution to perform the following tasks accurately and efficiently:

- Create images of different sizes from the original digital image in order to meet various needs of different users and manipulate the images to suit various purposes before storing them
- Define a data model appropriate to the type of information being stored
- Load the images and the associated metadata, which is defined by the institution, into the IBM Digital Library
- Search for images by entering a specific piece of descriptive information, the author's name, for example, or by searching a text description
- Display the results of the search and obtain displays of different sizes of images and their accompanying descriptive information.

The Data Model

One of first issues to consider when storing digital assets is the data model. The data model consists of the description and arrangement of the information to be stored, an explanation of how it is to be searched, and what relationships exist among the pieces of information being stored. In the IBM

Digital Library Collection Treasury Solution the following information is stored for each item:

- The original, full resolution digitized image
- A thumbnail-sized image of the original that is used for display on the search results screen of the web interface
- A screen sized image that can be watermarked
- A network image, which can also be watermarked. This image is larger than screen size, but smaller than the original. It is also a derivative of the original image
- A text part that contains an abstract, which is a verbal description of the image.
- Descriptive information about the item, called attributes, by which the item is referenced when made the object of a search.

The basic structure of this data model is “flat.” This means there are no “folders” or “trees” in which items are associated. There is no hierarchical relationship between items. A search path is across an entire class of discrete items and does not follow any paths formed by any relationships the items may have to one another.

Generate and Enhance Derivative Images

The end use of a digitized image determines the size, compression and whether watermarking is needed. In this solution you can obtain a small, thumbnail image, or a screen-sized, watermarked image, or a network-sized, watermarked image. All of these, plus the original full resolution image are stored. In order to facilitate the generation of these images and to be able to enhance digital images, several utilities are provided. Some of these utilities and their functions are:

- Image Reduction -
  Produce a smaller, thumbnail version of the original image, for display on a gallery page of the web interface

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- Rotation -
  Rotate an image. This is very useful when the original scanned image is the wrong orientation.

- Sharpening -
  Refine or enhance the lines and edges within an image.

- Color correction -
  Modification of a display color space that may be filled with an inaccurate or incorrect color, tone, or hue. This utility is intended for images produced by the TDI scanner

- Visible watermarking of derivative images

- JPEG or GIF compression -
  The original TIFF image can be compressed into JPEG or GIF format.

Loading the Digital Library

An application is also provided that allows you to load the digital images and attributes. The number of images to be loaded is typically large, on the order of thousands. Because of this, loading images and attributes is performed in batch mode. The loader takes as input two sets of information about each image: The first set, content, consists of the original image, its derivative images, and an optional set of search information in ascii text. The second set of information consists of attributes, which is information that identifies the image. The loader application provides a way to define the data model, which is required before any loading can be done. Defining the data model consists of the following tasks:

- Selecting an existing Digital Library Index Class which must have a unique identifier attribute that associates all of the input for a given item,
- Mapping, or matching the input attribute values to the index class attributes,
- Specifying the content parts, their location and how they map to the content part names.

Original, high resolution images and their derivative images are loaded from a standard file system. This could be on CD ROM. The attributes are loaded from a formatted flat file. This file could be generated from the data in an existing database. Format descriptions and sample files will be provided.

Loading is often performed in successive stages. In the first stage, when items are created, at least one attribute value must be loaded for each item. In the subsequent stages, the actual images, including the original and the derivatives, are loaded. The loader is capable of providing these functions as distinctly separate processes.

Internet Connection application for searching and viewing images

An application is also provided with the solution that allows you to access the digital assets via the web through Digital Library's Internet Connection. This application is easily customizable to indicate the name of the institution to which it is connected. This task does not require an in depth knowledge of programming. With further experience and knowledge, a user can customize the look and feel by changing the actual HTML templates. The flow can also be modified by changing the perl code.

Items can be found either by searching for a value of a particular attribute, the author, for example, or by searching the indexed text part of Search Manager. Figure 1, on the following page, shows the search screen used for this task.

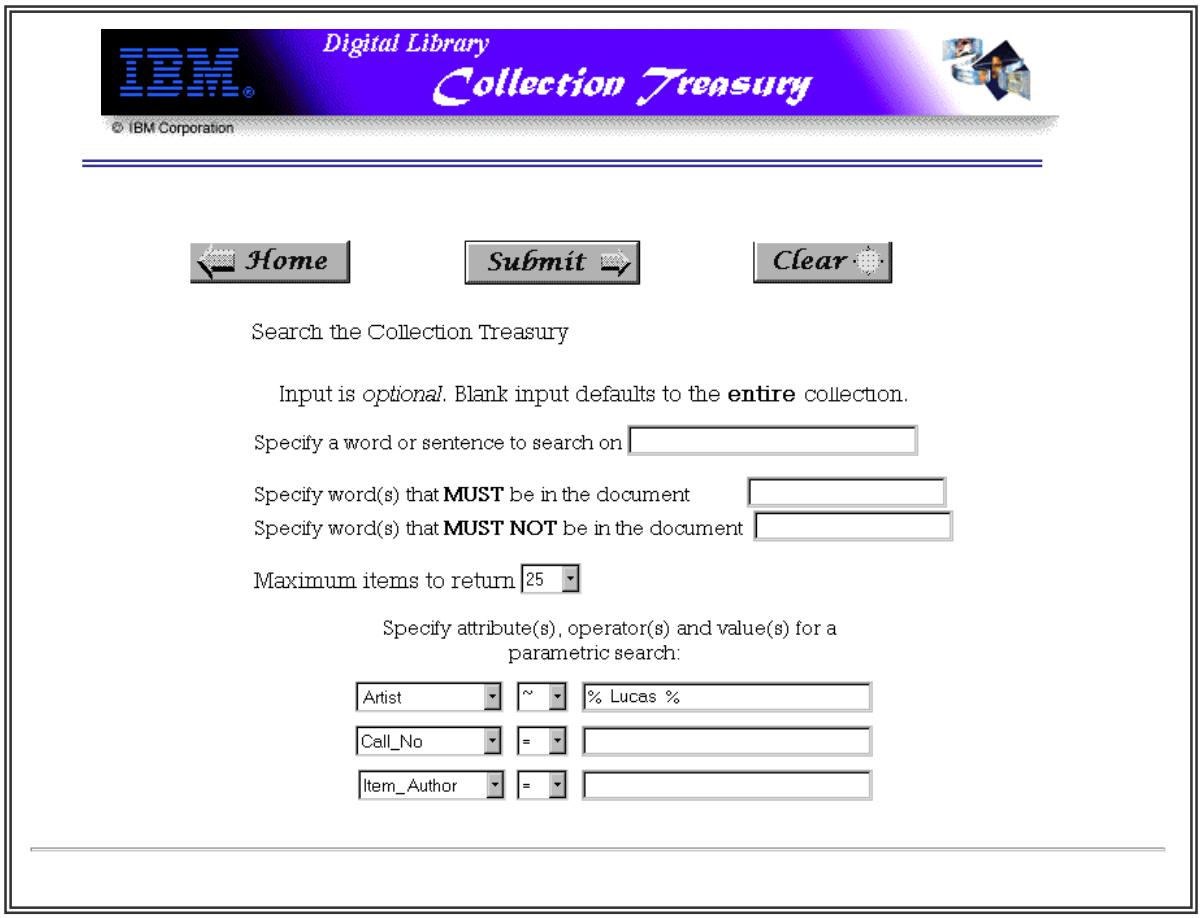

Figure 1: The Search Screen

When the search is completed, the appropriate items are displayed on a gallery page showing the "thumbnail" image of each result along with summary information, usually one of the attributes associated with the item. The gallery page is shown in Figure 2, below.

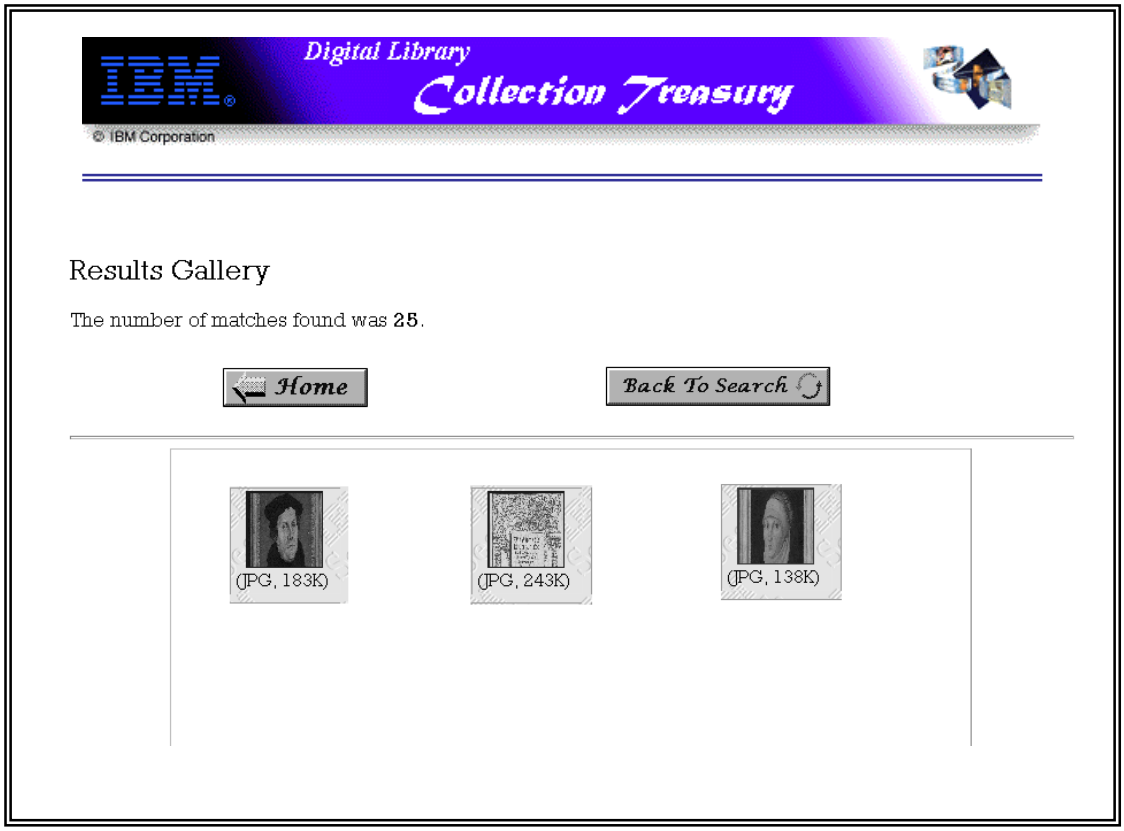

Figure 2: The Gallery Page

You can then select the image you are interested in by clicking on it and DLCT displays a screen-size, watermarked image like the one shown in Figure 3, on the following page.

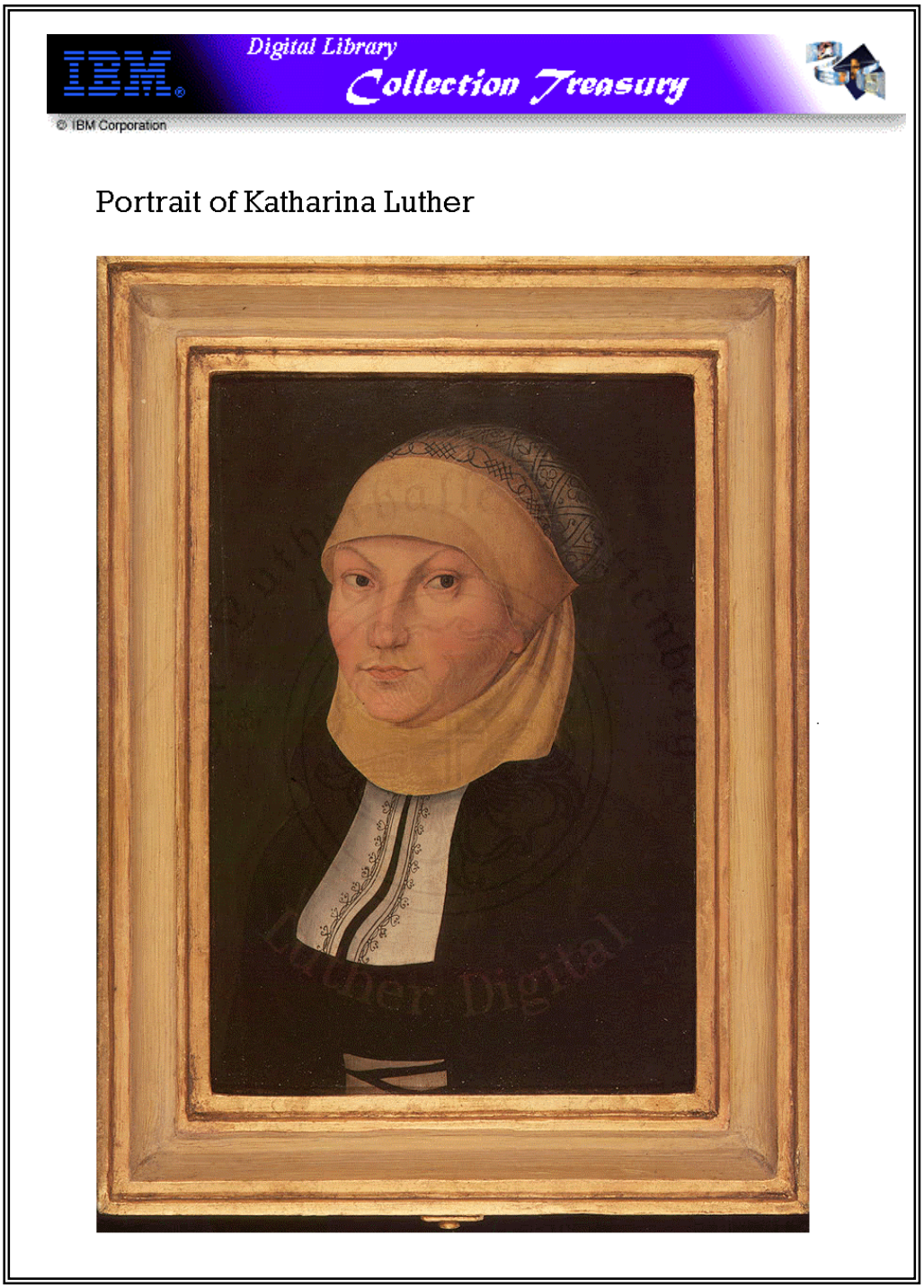

Figure 3: Screen-Size Watermarked Image

By clicking on the summary information below the screen-sized image, the abstract, or textual information is displayed along with a thumbnail image, as shown in Figure 4, below.

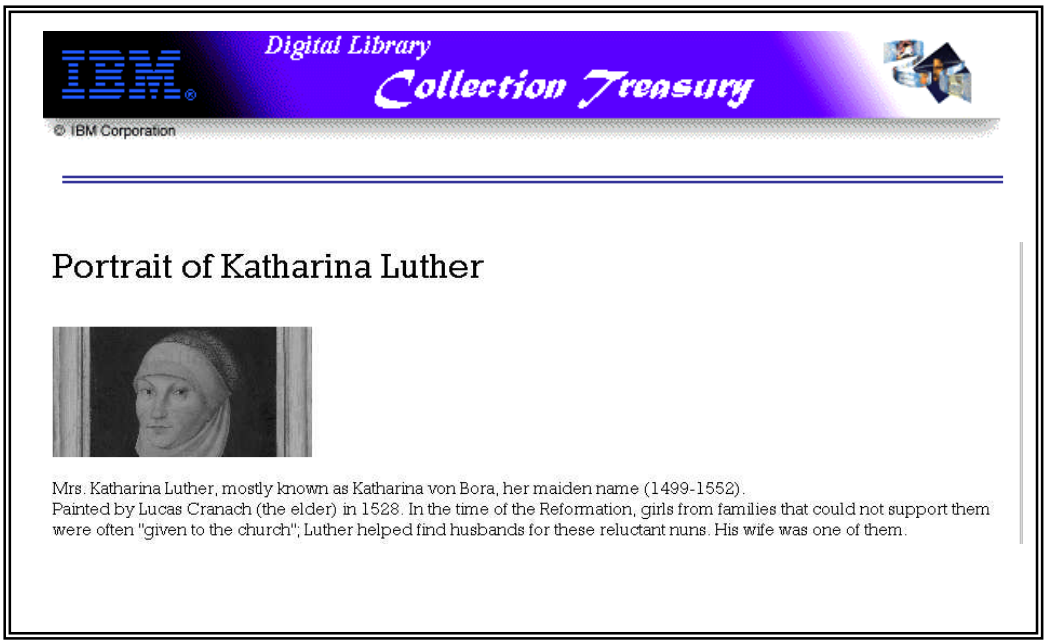

Figure 4: Thumbnail Image With Abstract

Platforms Supported and Functions Provided by DLCT, Version 1

IBM Digital Library Collection Treasury Solution, Version1, supports both AIX and OS/2 platforms. The particular functions supported for each of these platforms is displayed in Table 1, on the following page.

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Image Enhancement Function	AIX	OS/2
Reduction (derivative images)		x
Rotation		
Sharpening		x
Color correction for a display color space for images produced by the TDI scanner		x
Visible image watermarking		x
JPEG or GIF compression		x
Loading the Digital Library	x	
Digital Library Servers (an OS/2 system administration machine is required).	x	x
IBM Digital Library Collection Treasury Solution client access for searching and viewing images runs on all platforms with a web browser		

Table 1: Platforms Supported Showing Functions Provided For Each.

Work is currently underway to port these image enhancement tools to other platforms, such as Windows 95 and NT. While they may not be available with the original solution, they will be made available as they are ported.

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Summary

While the IBM Digital Library Collection Treasury Solution, Version 1, may not address all of the requirements of cultural archives, it does provide sufficient functions and utilities to establish an excellent starting point for museums and libraries with special collections to begin digitizing, storing, and accessing their collections.

This solution is based on IBM Digital Library, Release 1, and will be available at the end of June, 1997.

Digital Library
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