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CREATING DIGITAL LIBRARIES FOR THE 21ST CENTURY

The restructuring of the nation's library system into a high capacity digital archive of books, drawings, manuscripts, documents, and photographs that can be transmitted, at high speed, to computer screens anywhere in the country in their original format, is on the verge of becoming reality.

This emerging "meta-library" is an unanticipated spin-off of high performance computing and is likely to have the broadest impact of any aspect of this information revolution. Millions of students and researchers will use it via the Internet, and access will be essential for every educational institution and industrial enterprise to remain competitive.

The most striking evidence of the closeness of this development was the announcement by the Library of Congress, in the fall of 1994, of its goal to convert the most important materials in its collections, and from the collections of all public research libraries in the country, into digital form by the year 2000.

The immediate advantages of such a move are:

- Providing instant access for anyone and everyone to a worldwide repository of information in its original format.
- Protecting rare books and historic documents that are rapidly deteriorating through vandalism or overuse. In digital form they can be viewed repeatedly and copied without harming the original.
- Solving massive storage problems. Materials that take up many shelves can be stored on a single disk.

One of the strongest examples of interagency and private sector cooperation and support in high performance computing is the recent announcement of \$24.4 million dollars for the research and development of new technologies for digital libraries. This joint initiative of the National Science Foundation, NASA and the Defense Advanced Research Projects Agency, brings together researchers based at six universities with those from industry and relevant technical and subject matter organizations to solve problems relating to the large scale

digitalization of library information.

These problem areas include: Indexing specialized materials such as maps and aerial photos; creating a national integrated digital library system; focusing on scientific literature; developing multimedia libraries for earth and space science; creating a prototype library for environmental sciences; researching science and math programming from video archives.

While the Library of Congress is raising funds for its undertaking from a mix of public and private sources, it must be remembered that digital libraries been made possible only because of technology developed over several years by academically-based high performance research pursued under federal support. Leading universities, in concert with libraries, industry and government, are involved in every phase of the current effort to digitalize all of America's libraries.

There are still many technical, legal and policy hurdles to overcome. Questions of copyright, security and quality standards are still to be hammered out. The storage, indexing, searching, retrieval and processing of massive bodies of new and extant information, in user-friendly ways, are all tasks requiring the kind of fundamental research and development provided by the academic high performance computing community.