network infrastructure (and pressures of global marketplaces) and the requirements of the networked information community in the United States (which is certainly the dominant force in this area today) to build an effective infrastructure quickly and at reasonable cost. One consequence of this is that there is a considerable amount of at least partially duplicative work taking place, and the competing standards are causing confusion among the user community. There is also at least some anecdotal evidence that the private sector is increasingly turning away from the formal standards-setting process in frustration.

Some of the problems related to standards are funding problems; for example, it seems likely that relatively small investments, properly structured and applied, could help a great deal with the problem of broad community participation in networked information standards development and the speed with which such standards are developed. Encouraging marketplace implementation of standards is much more difficult; there is a fine art in developing and selecting standards that are viable and appropriate. To some extent this is the responsibility of purchasers, but today purchasers are often defeated in their attempts to acquire standards-conformant products by the lack of reasonable standards available to specify. Addressing the remain issues presents very complex policy and management problems for standards organizations and the communities that they serve, and, ultimately, for the United States government itself. A review of policies in the standards area as they relate to networking and networked information, with some specific emphasis on the relationship between policy choices and timely and effective progress on the construction of network and networked information infrastructure in the United States, is needed.

16.   Recommendations for Possible Action

Legislative, Government and Public Policy Actions

•It is clear that cryptographic technology will be required to ensure the integrity of electronic information. Incorporation of this technology on a broad basis in the networked environment (including internationally) has been effectively paralyzed by a series of issues concerning intellectual property, standards, and exprot controls. It is time to address these issues in a systematic way and develop policies that will guide and encourage the implementation of the appropriate and needed integrity and authentication functions.

•Intellectual property issues are central to ensuring access and integrity for electronic information, particularly **as** this information becomes an increasingly substantial and important part of our intellectual record as a society. Consideration needs to be given both to clarifying the existing intellectual property laws as they relate to various forms of electronic information, particularly in a networked environment, and also to a review of whether the current balance between rightsholders and the public as defined in the copyright laws will continue to accomplish public policy objectives in the networked information environment. Immediate legislative action may well not be the answer; rather, the formation of a group similar to the National Commission on New Technological Uses of Copyrighted Works (CONTU) in the late 1970s might be an effective way to make progress at this time.

●A policy for networked access to federal government information which encourages such access at very reasonable costs is important both in its own right and also to stimulate technology development, network use, and to serve as a model for information policy development by governments at the state and local levels.

●A public policy debate related to expectations of privacy, confidentiality and anonymity in access to electronic information is needed to establish consensus on the objectives to be achieved by policy development and legislation. In addition, actions are needed to help make the public aware of the current state of affairs so that informed choices can be made by individuals. It may be appropriate to cast this effort in a larger context of individual privacy.

●Funding is needed to support research, development, prototype experiments, standards work, and networked information infrastructure construction. This is not the same as funding the development of the networks themselves. A substantial part of this need may be addressed by legislation currently under consideration by Congress. I believe that it is important to recognize that a substantial research component is needed here, and that a number of diverse, moderate scale prototypes will serve us better at this time than simply subsidizing the construction of one or two very large operational prototypes of "digital libraries".

●A major policy review of the standards development process and the organizations involved in this process is needed, in the context of information technology, electronic information, and computer-communications networks with consideration of both international implications and national needs. This should be conducted jointly with the standards development community and also seek broad participation by users of standards.

●A number of steps could be taken to ensure the public's access to electronic information resources. This might include some specific funding to help the existing library system, license of certain collections of information for unlimited use nationally, support to help schools license access to information, or other measures.

●Further consideration should be given to ways in which government funded electronic information resources, particular in the networked information environment, can help to achieve public policy goals such as controlling the increase in health care costs and improving the effectiveness of the educational system and national competitiveness. Such resources have proven effective in the past.

●Efforts to ensure the preservation of the cultural, historical and scholarly record as this becomes increasingly composed of electronic information are needed. This involves not just copyrighted information from publishers and other information providers but also public information. There are **a** number of government and nonprofit organizations with interests in this area, including (to name only a few) the National Endowment for the Humanities, the National Archives, the Library of Congress (both in its role as a library and as the registry for copyright), the Commission on Preservation and Access, the National Science Foundation, the National Library of Medicine, the National Library of Agriculture and the Association of Research Libraries. Consideration needs to be given to how to most effectively coordinate efforts on these issues.

Actions by the Stakeholders: Authors, Publishers, Libraries, Information Technology Providers and the Education Community

• There is a need for continued discussion among the stake holders as to the meaning of publication in the networked information environment and community expectations about continuity of access to electronic works, integrity of such works, and related topics. Organizations like the Coalition for Networked Information can play a key role in facilitating such discussions.

• A greater understanding of the increasing diversity of publication or information distribution paths available to authors and the implications of choices among these paths for the library, research and education, and publisher communities is needed. This may include some reassessment of the valuation placed on electronic publication channels in areas such as university tenure and promotion decisions, for example.

• Increased investment in the development and implementation of appropriate standards to facilitate the authoring, distribution and preservation of networked information is required. Further, these standards should reflect the evolving consensus about integrity and access to networked information.

• Publishers and libraries need to attempt again to reach a compromise about the uses of new technologies and their relation to copyrighted works which addresses the concerns of both parties. This could take the form of agreements about some limited' use of licensed electronic information for interlibrary loan, for example.

• Libraries, publishers and the scholarly community need to begin discussions about their roles and responsibilities in preserving and ensuring long-term access to the scholarly and cultural record. Broadcast media providers also need to be brought into these discussions. This is an area where it seems the financial stakes may not be high (unlike, perhaps, the interlibrary sharing of licensed electronic information) but which has great societal importance, and where it may be possible to make significant progress quickly. Such discussions might also provide a basis for informing future legislative options if appropriate.