



## **Chapter III**

# **Toward a Model of the Migration of Communication Between Media Devices**

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## **ABSTRACT**

*The ever-increasing volume of information generated by humanity has been supported by our ability to invent devices that record, store, retrieve and communicate this information in a variety of media, presented by a variety of devices. Since new media devices are continually emerging, and each device has different utility, it is possible that a great deal of information will need to be migrated between media devices in order to take advantage of their utility. While computer programs that perform migration automatically would help to process the potential volume of information being migrated, such programs will require a model of the migration of communication between media devices. In this chapter, we propose such a model that is based on ideas from information theory and media modeling. The model represents a number of interacting components including: the dimensions and utility of the media device; the media of and*

*structure of communication; and conversion functions between media devices. We evaluate it by applying it theoretically to one of the important tasks in digital libraries: the digitisation (migration) of a set of highly structured textbooks to hypertext. We argue that emerging web-technologies could assist the automatic migration of communication between media devices as long as specific components of the migration model are present in the information. Applications of this model lie in the preservation of digital libraries, which must be able to migrate between media devices in order to be immune to degradation and technological obsolescence.*

## INTRODUCTION

There is a lot of information in the world. In 1997, it was estimated that there were a few thousand peta-bytes of information, based on aggregated estimations of the information volumes stored in major vessels such as the Library of Congress, the Internet, and various collections of cinema and broadcasting (Lesk, 1997). For people to gain access to this information, they require the ability to retrieve and engage with it, using some media device for interaction and presentation.

Like information, the number and types of media devices continue to grow. While books originally became the ubiquitous media device, the onset of the electronic age has seen a great increase in the number of media devices. There are enough devices now such that they are typically classified by the type of sensory input they provide to a user (visible, audible, or haptic), and include such devices as microfiche, personal computer monitors, headphones, and force-feedback devices (M. Bordegoni, 1997). It is predicted that new electronic devices will continue to emerge in the foreseeable future, thus, flexibility in the way information is represented is critical (Nunberg, 1996).

The emphasis of migration in the computing world has largely been focused on moving legacy information systems software from its original environment to modern architectures, tools and databases, running on a new hardware platform (J. Bisbal, 1999). The effort expended on this type of migration is, and will continue to be, significant: It is estimated that legacy information systems maintenance consumes 90% to 95% of information systems resources (M. Brodie, 1993). Typically, such migration occurs without change in either the media or the media devices; rather, the underlying representation of the information is modified so that the information can be better used with new

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