Chapter XX
Intellectual Property Protection in Multimedia Grids

Irene Kafeza
Attorney at Law, Greece

Eleanna Kafeza
Athens University of Economics and Business, Greece

ABSTRACT

The Grid environment is rapidly emerging as the dominant paradigm for wide-area-distributed application systems. The multimedia applications demand intense problem-solving capabilities, and Grid-computing makes it possible to share computing resources on an unprecedented scale among geographically distributed participants. In a Grid environment, virtual organisations are formulated and managed from a computing resource point of view. The Grid provider allows for the dynamic discovery of computing resources, the immediate allocation and provision of the resources, and the management and provision of secure access. Although the security problem in Grid environment is being addressed from the technological point of view, there is no work to identify the legal issues that are arising in Grid multimedia transactions.

INTRODUCTION

The new generation of advanced Grid technologies enabled the use of pervasively networked and interoperable computing resources as a technological infrastructure for easier access to processing, reproduction, and transmission of data. The shared access to widely distributed computing resources promises to greatly lower the time and costs of accessing and using multimedia data for a number of purposes. The placement of such powerful dynamically shaped technology into the mainstream comes with some complications. The danger this development brings with it is that, what is gained in efficiency may be lost because of copyright infringement; thus, new ways

of dealing with security are necessary. Although the Grid's unsuitability to regulation seems a fact, the structure of intellectual property rights could force technological gatekeepers to block unauthorised uses of unauthorised data and allow only authorized data flows.

Graphics, visualization, computer games, streaming media, broadcasting,and e-health are only some examples of applications where high volumes of multimedia data need to be efficiently stored, accessed, transferred, and processed. Nowadays, with digital television archives, cameras, and sensors collecting real-time data ubiquitously, multimedia archives need petabytes of storage, while high computation power is necessary for content analysis. The Grid computing environment is a collection of heterogeneous computing resources that are physically diverse but interconnected, and shared by many individuals and organizations. Grid technology is designed to solve problems inherent to multimedia data-intensive applications that relate to storage and processing of remote data.

There are several issues to be addressed when access is granted to Grid resources. Grid resources are shared within a virtual organisation (Foster, Kesselman, & Tuecke, 2001). Different organisations pool resources together and collaborate in order to achieve a common goal. However, when composing the Grid, security is of major concern. A secure Grid platform will enable safe and stable collaboration of various resource owners and service users. This requirement is twofold: on one hand, a secure technical infrastructure has to be in place, and on the other hand, a legal framework has to be introduced to increase confidentiality and enable predictability of transactions on the Grid. Figure 1 is an example on how organisations can contribute their resources and create virtual organisations.

The most well-known Grid solution is the Globus Toolkit, an open source software tool kit used for building Grids. In Globus, the Grid security infrastructure (GSI) uses PKI and X.509 certificates. The system identifies every user/service on the Grid by a standard X.509 certificate that contains information about the user/service signed by a third party CA to certify it. GSI uses the secure socket layers/transport layer security (SSL/TSL) authentication (Kanaskar, Topaloglu,

Figure 1. Virtual organisations (VOs). Virtual organisation A is created by resources contributed by different organisations in order to solve life insurance problems. Similarly, organisations share computing cycles and data storage, creating virtual organisation B in order to deal with financial modelling problems.