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Inventors: ~~Scott Moskowitz & Michael Berry~~ ~~A Secure Personal Content Server~~ SECURE

PERSONAL CONTENT SERVER

Field of Invention

The present invention relates to the secure distribution of digitized value-added information, or media content, while preserving the ability of publishers to make available ~~unsecure~~ unsecured versions of the same value-added information, or media content, without adverse effect to the systems security.

Authentication, verification and authorization are all handled with a combination of cryptographic and steganographic protocols to achieve efficient, trusted, secure exchange of digital information.

Cross-Reference To Related Application

This application is based on and claims the benefit of pending U.S. Patent Application Serial No. 60/147,134, filed 08/04/99, entitled, "A Secure Personal Content Server:" ~~MUST FOLLOW THIS SENTENCE WITH ONE OF THE TWO PARAGRAPHS BELOW~~ and pending U.S. Patent Application Serial No. 60/213,489, filed 06/23/2000, entitled "A Secure Personal Content Server."

This application also ~~claims the benefit of~~ incorporates by reference the following applications: ~~pending U.S. Patent Application Serial No. 09/046,627, filed 3/24/98, entitled "Method for Combining Transfer Function with Predetermined Key Creation"; pending U.S. Patent Application Serial No. 09/053,628, filed 04/02/98, entitled "Multiple Transform Utilization and Application for Secure Digital Watermarking"; pending U.S. Patent Application Serial No. 60/169,274, filed 12/7/99, entitled "Utilizing Data Reduction in Steganographic and Cryptographic Systems"; and U.S. Patent Application Serial No. _____, filed June 16, 2000, entitled "Utilizing Data Reduction in Steganographic and Cryptographic Systems" (which is a continuation in part of PCT application No. PCT/US00/ 06522, filed 14 March 2000, which PCT application claimed priority to U.S. Provisional Application No. 60/125,990, filed 24 March 1999) All of the patent applications previously identified in this paragraph are hereby incorporated by reference, in their entireties.~~ ~~This application also claims the benefit of pending~~ pending U.S. Patent Application Serial No. 08/999,766, filed 7/23/97, entitled "Steganographic Method and Device"; pending U.S. Patent Application Serial No. 08/772,222, filed 12/20/96,

entitled “Z-Transform Implementation of Digital Watermarks”; pending U.S. Patent Application Serial No. 09/456,319, filed 12/08/99, entitled “Transform Implementation of Digital Watermarks”; pending U.S. Patent Application Serial No. 08/674,726, filed 7/2/96, entitled “Exchange Mechanisms for Digital Information Packages with Bandwidth Securitization, Multichannel Digital Watermarks, and Key Management”; pending U.S. Patent Application Serial No. 09/545,589, filed 04/07/2000, entitled “Method and System for Digital Watermarking”; pending U.S. Patent Application Serial No. 09/046,627, filed 3/24/98, entitled “Method for Combining Transfer Function with Predetermined Key Creation”; pending U.S. Patent Application Serial No. 09/053,628, filed 04/02/98, entitled “Multiple Transform Utilization and Application for Secure Digital Watermarking”; pending U.S. Patent Application Serial No. 09/281,279, filed 3/30/99, entitled “Optimization Methods for the Insertion, Protection, and Detection...”; U.S. Patent Application Serial No. ~~09/594,719~~, [09/594,719](#), filed June 16, 2000, entitled “Utilizing Data Reduction in Steganographic and Cryptographic Systems” (which is a continuation-in-part of PCT application No. PCT/US00/06522, filed 14 March 2000, which PCT application claimed priority to U.S. Provisional Application No. 60/125,990, filed 24 March 1999); and pending U.S. Application No 60/169,274, filed 12/7/99, entitled “Systems, Methods And Devices For Trusted Transactions.” All of the patent applications previously identified in this paragraph are hereby incorporated by reference, in their entireties.

Background of the Invention

The music industry is at a critical inflection point. Digital technology enables anyone to make perfect replica copies of musical recordings from the comfort of their home, or as in some circumstances, in an offshore factory. Internet technology enables anyone to distribute these copies to their friends, or the entire world. Indeed, virtually any popular recording is already likely available in the MP3 format, for free if you know where to look.

How the industry will respond to these challenges and protect the rights and livelihoods of copyright owners and managers and has been a matter of increasing discussion, both in private industry forums and the public media. Security disasters like the cracking of DVD-Video’s CSS security system have increased doubt about the potential for effective robust security implementations. Meanwhile, the success of non-secure initiatives such as portable MP3 players lead many to believe that these decisions may have already been made.

Music consumers have grown accustomed to copying their music for their own personal use. This fact of life was written into law in the United States via the Audio Home Recording Act of 1992. Millions of consumers have CD players and purchase music in the Compact Disc format. It is expected to take years for a format transition away from Red Book CD Audio to reach significant market penetration.

Hence, a need exists for a new and improved system for protecting digital content against unauthorized copying and distribution.

Summary of the Invention

A local content server system (LCS) for creating a secure environment for digital content is disclosed, which system comprises: a communications port in communication for connecting the LCS via a network to at least one Secure Electronic Content Distributor (SECD), which SECD is capable of storing a plurality of data sets, is capable of receiving a request to transfer at least one content data set, and is capable of transmitting the at least one content data set in a secured transmission; a rewritable storage medium whereby content received from outside the LCS may be stored and retrieved; a domain processor that imposes rules and procedures for content being transferred between the LCS and devices outside the LCS; and a programmable address module which can be programmed with an identification code uniquely associated with the LCS. The LCS is provided with rules and procedures for accepting and transmitting content data. Optionally, the system may further comprise: an interface to permit the LCS to communicate with one or more Satellite Units (SU) which may be connected to the system through the interface, which SUs are capable of receiving and transmitting digital content; at least one SU; and/or at least one SECD. The SECD may have a storage device for storing a plurality of data sets, as well as a transaction processor for validating the request to purchase and for processing payment for a request to retrieve one of the data sets. The SECD typically includes a security module for encrypting or otherwise securitizing data which the SECD may transmit.

A method for creating a secure environment for digital content for a consumer is also disclosed. As part of the method, a LCS requests and receives a digital data set that may be encrypted or scrambled. The digital data set may be embedded with at least one robust open watermark, which permits the content to be authenticated. The digital data set is preferably be embedded with additional watermarks which are generated using information about the LCS requesting the copy and/or the SECD which provides the copy. Once received by the LCS, the

LCS exercises control over the content and only releases the data to authorized users. Generally, the data is not released until the LCS embeds at least one additional watermark based upon protected information associated with the LCS and/or information associated with the user.

Another embodiment of the method of the present invention comprises: connecting a Satellite Unit to an local content server (LCS), sending a message indicating that the SU is requesting a copy of a content data set that is stored on the LCS, said message including information about the identity of the SU; analyzing the message to confirm that the SU is authorized to use the LCS; retrieving a copy of the requested content data set; assessing whether a secured connection exists between the LCS and the SU; if a secured connection exists, embedding a watermark into the copy of the requested content data set, said watermark being created based upon information transmitted by the SU and information about the LCS; and delivering the content data set to the SU for its use.

The SU may also request information that is located not on the LCS, but on an SECD, in which case, the LCS will request and obtain a copy from the SECD, provided the requesting SU is authorized to access the information.

Digital technology offers economies of scale to value-added data not possible with physical or tangible media distribution. The ability to digitize information both reduces the cost of copying and enables perfect copies. This is an advantage and a disadvantage to commercial publishers who must weigh the cost reduction against the real threat of unauthorized duplication of their value-added data content. Because cost reduction is an important business consideration, securing payment and authenticating individual copies of digital information (such as media content) presents unique opportunities to information service and media content providers. The present invention seeks to leverage the benefits of digital distribution to consumers and publishers alike, while ensuring the development and persistence of trust between all parties, as well as with any third parties involved, directly or indirectly, in a given transaction.

In another approach that is related to this goal, there are instances where transactions must be allowed to happen after perceptually-based digital information can be authenticated. (Perceptually based information is information whose value is in large part, based upon its ability to be perceived by a human, and includes for example, acoustic, psychoacoustic, visual and psychovisual information.) The process of authenticating before distributing will become increasingly important for areas where the distributed material is related to a trust-requiring

transaction event. A number of examples exist. These include virtual retailers (for example, an on-line music store selling CDs and electronic versions of songs); service providers (for example, an on-line bank or broker who performs transactions on behalf of a consumer); and transaction providers (for example, wholesalers or auction houses). These parties have different authentication interests and requirements. By using the teachings of this application, these interests and requirements may be separated and then independently quantified by market participants in shorter periods of time.

All parties in a transaction must authenticate information that is perceptually observable before trust between the parties can be established. In today's world, information (including perceptually rich information) is typically digitized, and as a result, can easily be copied and redistributed, negatively impacting buyers, sellers and other market participants. Unauthorized redistribution confuses authenticity, non-repudiation, limit of ability and other important "transaction events." In a networked environment, transactions and interactions occur over a transmission line or a network, with buyer and seller at different points on the line or network. While such electronic transactions have the potential to add value to the underlying information being bought and sold (and the potential to reduce the cost of the transaction), instantaneous piracy can significantly reduce the value of the underlying data, if not wholly destroy it. Even the threat of piracy tends to undermine the value of the data that might otherwise exist for such an electronic transaction.

Related situations range from the ability to provably establish the "existence" of a virtual financial institution to determining the reliability of an "electronic stamp." The present invention seeks to improve on the prior art by describing optimal combinations of cryptographic and steganographic protocols for "trusted" verification, confidence and non-repudiation of digitized representations of perceptually rich information of the actual seller, vendor or other associated institutions which may not be commercial in nature (confidence building with logo's such as the SEC, FDIC, Federal Reserve, FBI, etc. apply). To the extent that an entity plays a role in purchase decisions made by a consumer of goods and services relating to data, the present invention has a wide range of beneficial applications. One is enabling independent trust based on real world representations that are not physically available to a consumer or user. A second is the ability to match informational needs between buyers and sellers that may not be universally appealing or cost effective in given market situations. These include auction models based on

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