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Multimedia Protection and Security System over Clouds

V. DIVYA[1], T. SURESH[2]

[1]PG Scholar, Dept of Computer Science & Technology, Priyadarshini College of Engineering, Sullurpeta, AP, India.
[2]Assoc Prof & HOD, Dept of Computer Science & Technology, Priyadarshini College of Engineering, Sullurpeta, AP, India.

Abstract: We propose a new design for large-scale multimedia content protection systems. Our design leverages cloud infrastructures to provide cost efficiency, rapid deployment, scalability, and elasticity to accommodate varying workloads. The proposed system can be used to protect different multimedia content types, including 2-D videos, 3-D videos, images, audio clips, songs, and music clips. The system can be deployed on private and/or public clouds. Our system has two novel components: (i) method to create signatures of 3-D videos, and (ii) distributed matching engine for multimedia objects. The signature method creates robust and representative signatures of 3-D videos that capture the depth signals in these videos and it is computationally efficient to compute and compare as well as it requires small storage. The distributed matching engine achieves high scalability and it is designed to support different multimedia objects. We implemented the proposed system and deployed it on two clouds: Amazon cloud and our private cloud. Our experiments with more than 11,000 3-D videos and 1 million images show the high accuracy and scalability of the proposed system. In addition, we compared our system to the protection system used by YouTube and our results show that the YouTube protection system fails to detect most copies of 3-D videos, while our system detects more than 98% of them. This comparison shows the need for the proposed 3-D signature method, since the state-of-the-art commercial system was not able to handle 3-D videos.

Keywords: 3-D Videos, Multi-Cloud System, Storage.

I. INTRODUCTION

The problem of protecting various types of multimedia content has attracted significant attention from academia and industry. One approach to this problem is using watermarking, in which some distinctive information is embedded in the content itself and a method is used to search for this information in order to verify the authenticity of the content. Many previous works proposed different methods for creating and matching signatures. These methods can be classified into four categories: spatial, temporal, color, and transform-domain. Spatial signatures (particularly the block-based) are the most widely used. Youtube Content ID, Vobile VDNA, and Mark Monitor are some of the industrial examples which use fingerprinting for media protection, while methods such as can be referred to as the academic state-of-the-art.

1. Watermarking approach may not be suitable for already-released content without watermarks in them. Watermarking may not be effective for the rapidly increasing online videos, especially those uploaded to sites such as YouTube and played back by any video player.
2. Spatial signatures weakness is the lack of resilience against large geometric transformations. Temporal and color signatures are less robust and can be used to enhance spatial signatures. Transform-domain signatures are computationally intensive and not widely used in practice.

II. PROPOSED SYSTEM

We present a novel system for multimedia content protection on cloud infrastructures. The system can be used to protect various multimedia content types. In our proposed system we present complete multi-cloud system for multimedia content protection. The system supports different types of multimedia content and can effectively utilize varying computing resources. Novel method for creating signatures for videos. This method creates signatures that capture the depth in stereo content without computing the depth signal itself, which is a computationally expensive process. New design for a distributed matching engine for high-dimensional multimedia objects. This design provides the primitive function of finding -nearest neighbors for large-scale datasets. The design also offers an auxiliary function for further processing of the neighbors. This two-level design enables the proposed system to easily support different types of multimedia content. The focus of this paper is on the other approach for protecting multimedia content, which is content-based copy detection (CBCD). In this approach, signatures are extracted from original objects. Signatures are also created from query (suspected) objects downloaded from online sites. Then, the similarity is computed between original and suspected objects to find potential copies.

Advantages of Proposed System:

1. Accuracy.
2. Computational Efficiency.

3. Scalability and Reliability.
4. Cost Efficiency.
5. The system can run on private clouds, public clouds, or any combination of public-private clouds.
6. Our design achieves rapid deployment of content protection systems, because it is based on cloud infrastructures that can quickly provide computing hardware and software resources.
7. The design is cost effective because it uses the computing resources on demand.
8. The design can be scaled up and down to support varying amounts of multimedia content being protected.

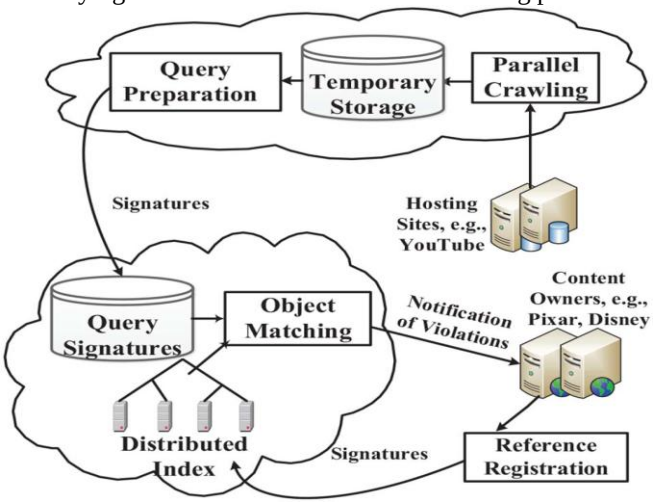


Fig1. System Architecture.

III. SYSTEM SPECIFICATION

A. Hardware Requirements:

System	:	Pentium IV 3.4 GHz.
Hard Disk	:	40 GB.
Monitor	:	14' Colour Monitor.
Mouse	:	Optical Mouse.
Ram	:	1 GB.

B. Software Requirements:

Operating system	:	Windows Family.
Coding Language	:	J2EE (JSP,Servlet,Java Bean)
Data Base	:	My Sql.
IDE	:	Eclipse - Galileo
Web Server	:	Tomcat 5.0/6.0
Web Designing	:	Dream Viewer
Documentation	:	MS Office

IV. SYSTEM STUDY

A. Feasibility Study

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential. Three key considerations involved in the feasibility analysis are:

B. Existing System

In Existing System, a straightforward integration method is being used. In straightforward integration method Storing data in a third party's cloud system causes serious concern on data confidentiality. In order to provide strong confidentiality for messages in storage servers, a user can encrypt messages by a cryptographic method before applying an erasure code method to encode and store messages. When he wants to use a message, he needs to retrieve the Codeword symbols from storage servers, decode them, and then decrypt them by using cryptographic keys.

Disadvantages of Existing System

1. The user can perform more computation and communication traffic between the user and storage servers is high.
2. The user has to manage his cryptographic keys otherwise the security has to be broken.
3. The data storing and retrieving, it is hard for storage servers to directly support other functions.

C. Proposed System

The proposed system addresses the problem of forwarding data to another user by storage servers directly under the command of the data owner. This considers the system model that consists of distributed storage servers and key servers. Since storing cryptographic keys in a single device is risky, a user distributes his cryptographic key to key servers that shall perform cryptographic functions on behalf of the user. These key servers are highly protected by security mechanisms. The distributed systems require independent servers to perform all operations. We propose a new threshold proxy re-encryption scheme and integrate it with a secure decentralized code to form a secure distributed storage system. The encryption scheme supports encoding operations over encrypted messages and forwarding operations over encrypted and encoded messages.

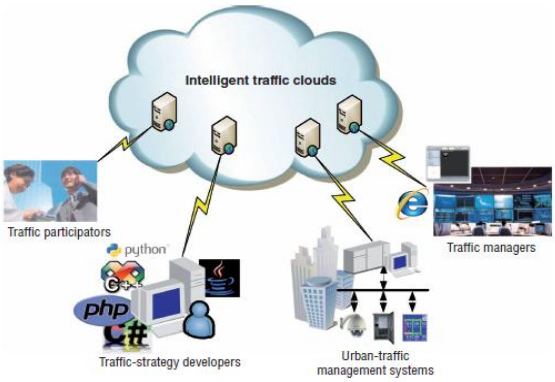


Fig 1. Architecture of Proposed System.

Advantages of Proposed System

1. Tight integration of encoding, encryption, and forwarding makes the storage system efficiently meet the requirements of data robustness, data confidentiality, and data forwarding.

2. The storage servers independently perform encoding and re-encryption process and the key servers independently perform partial decryption process.
3. More flexible adjustment between the number of storage servers and robustness.

V. MODULES IN PROPOSED SYSTEM AND IMPLEMENTATION

A. Modules in Proposed System

1. Agent-Based Traffic Management Systems Module
2. Intelligent Traffic Module
3. Traffic-Strategy Agent Module
4. Intelligent Traffic Clouds Storage Module

B. Input Design and Output Design

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Input Design considered the following things:

VI. DATA FLOW DIAGRAM

The Data Flow Diagram (DFD) is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.

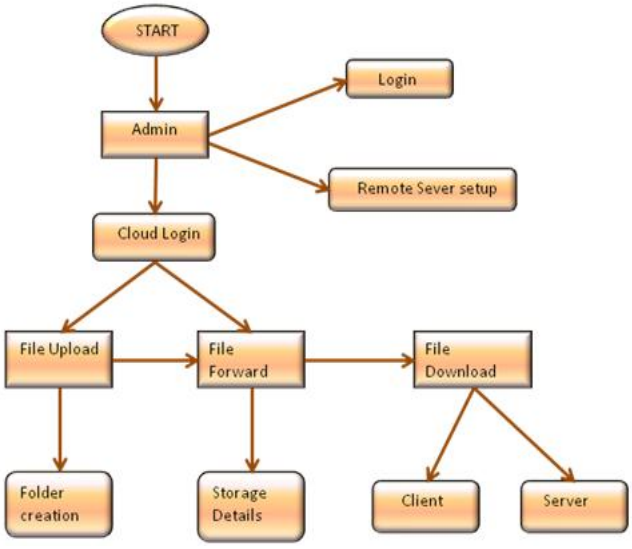
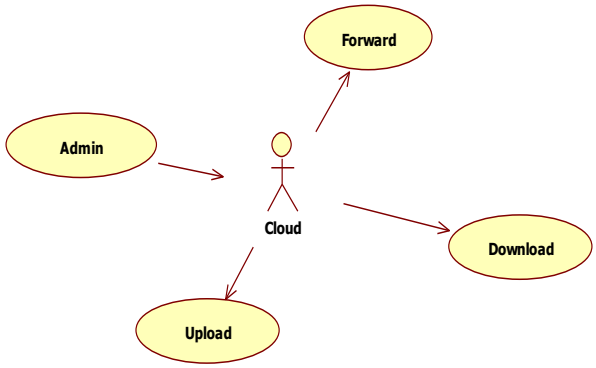


Fig 2. Data flow diagram.

A. Use Case Diagram

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



B. Class Diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.

VII. SOFTWARE ENVIRONMENT:

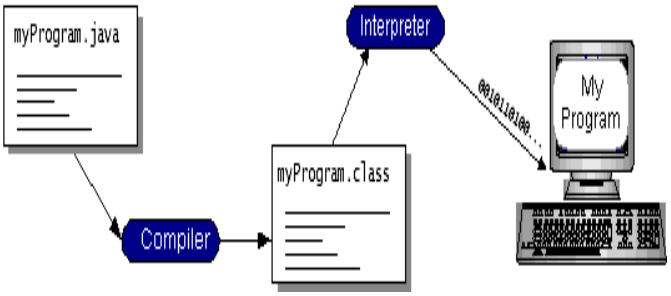


Fig 3. Role of Compiler & Interpreter in Java program execution.

Fig3 Illustrates the compilation happens once and interpretation happens every time in the execution of java program. You can think of Java byte codes as the machine code instructions for the *Java Virtual Machine* (Java VM). Every Java interpreter, whether it's a development tool or a Web browser that can run applets, is an implementation of the Java VM. Java byte codes help make "write once, run anywhere" possible. You can compile your program into byte codes on any platform that has a Java compiler. The byte codes can then be run on any implementation of the Java VM. That means that as long as a computer has a Java VM, the same program written in the Java programming language can run on Windows 2000, a Solaris workstation, or on an iMac.

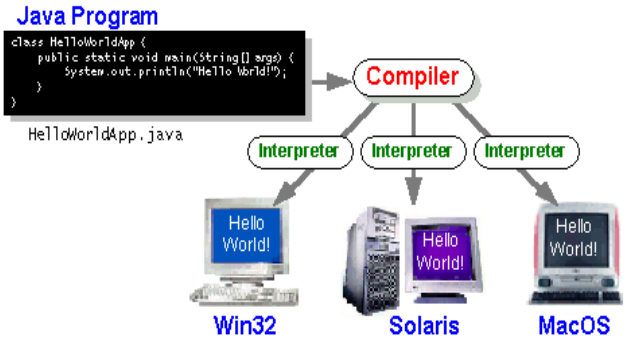


Fig 4. Java program and Platform independency.

Fig 4. Depicts the platform independency of java program (write once deploy in any platform Win32, Solaris, MacOS.

VIII. CONCLUSION

Urban traffic management systems based on cloud computing. The intelligent traffic clouds could provide traffic strategy agents and agent-distribution maps to the traffic management systems, traffic-strategy performance to the traffic-strategy developer, and the state of urban traffic transportation and the effect of traffic decisions to the traffic managers. It could also deal with different customers' requests for services such as storage service for traffic data and strategies, mobile traffic-strategy agents, and so on. A cloud storage system consists of storage servers and key servers, has been considered for this project. With the development of intelligent traffic clouds, numerous traffic management systems could connect and share the clouds' infinite capability, thus saving resources. As a future enhancement, the concept can be applied in the Cloud BI systems to have more secured data storage that can be shared across by various On Demand applications. The major cloud supplying vendors such as Amazon, Google and IBM can adopt to this erasure code based techniques for data storage in cloud.

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