

A Survey on Challenges to the Media Cloud

Ms. Lajja Vyas Ms. Shruti Raval Ms. Richa Sinha
Kalol Institute of Technology & Research Center
Gujarat Technological University, India

Abstract

Content of a media over Internet consumes significant amount of energy. Numerous application media applications, services and devices have introduced and clients are consuming more and more media. Media processing requires great capacity and capability.^[1] Cloud computing has proven a best technology for providing various services, great computing power, massive storage and bandwidth with modest cost. Integration of Media and Cloud can become very beneficial for both and hence becomes media cloud. In this paper we have discussed several challenges of media cloud. Those include Integration, Storage, Processing and Delivery.

Introduction

Media is a generic term for the many different forms of electronic communication that are made possible through the use of computer technology. Media refers to on-demand access to content anytime, anywhere, on any digital device, as well as interactive user feedback, creative participation and community formation around the media content. Another important promise of media is the “democratization” of the creation, publishing, distribution and consumption of media content along with real-time generation of new and user created content. Consumption of digital media is undergoing a major shift. Storage is moving from a local environment to virtually hosted one, propagation of network-connected devices is driving multiplatform access across the media chain and trends in social networking are influencing consumer opinion while also converging as mega platforms for digital media distribution and consumption_[2]. Today users are taking benefit of Wi-Fi, 3G and 4G like rapidly growing speed network. They are using Internet for different purposes including education, entertainment, social networking, video-on-demand, radio stations and voice messages. As a result this trend makes explosive and possibly long-term changes to the contents being exchanged over the internet. Although cloud evangelists are quick to point out the benefits of cloud computing technologies, enterprise leaders have identified integration as a major obstacle to successfully adopting and deploying Software as a Service (SaaS) and other web-based applications. Media convergence is another issue in developing a media cloud because media providers generally use the historical broadcasting and streaming technologies while media consumers are using modern aspect of publishing and sharing so Convergence of media consumer and provider demands new strategy for content administration. Cloud computing has the greatest potential to provide a long term package solution for the media revolution if deliberately designed, deployed and integrated with the advanced technologies on media storing, processing and transmission, along with the rational commercial model and industry strategy_[3]. The emergence of media cloud not only has great impact on the related research and technologies such as the architecture of the cloud computing platform, media processing, storing, delivery, and sharing, but also has profound impact on the commercial model, industry strategy, and even the society. In this paper we have discussed some of the challenges of a media cloud.

2. Challenges to media cloud

Different research proposals address the fundamental problems and challenges from different points of view, and focus on different directions._[4]

2.1. Media content Convergence

As a newly emerged technology, media cloud is competing with the existing media technologies and systems. The better way is to integrate and evolve smoothly instead of smashing and rebuilding. To do so various heterogeneities required to be deal with. Like

- Heterogeneity of Media types

As there exist different types of multimedia and services, such as voice over IP (VoIP), video conferencing, photo sharing and editing, multimedia streaming, image search, image-based rendering, video transcoding and adaptation, and multimedia content delivery, the cloud shall support different types of multimedia and multimedia services for millions of users simultaneously._[4]

- Heterogeneity of Services/clients

There are different types of services and clients available throughout glob. Same way there are so many categories of clients like a online radio listener, VOD user, social networking user, ebook reader and many more. A media cloud must adapt each type of services as well as all categories of clients to access data._[4]

- Heterogeneity of Networks and devices

As different networks, such as Internet, wireless local area network (LAN), and third generation wireless network, have different network characteristics, such as bandwidth, delay, and jitter, the cloud shall adapt multimedia contents for optimal delivery to various types of devices with different network bandwidths and latencies. As different types of devices, such as TVs, personal computers (PCs), and mobile phones, have different capabilities for multimedia processing, the cloud shall have multimedia adaptation capability to fit different types of devices, including CPU, GPU, display, memory, storage, and power.

- The heterogeneity of QoS requirements.

As different multimedia services have different QoS requirements, the cloud shall provide QoS provisioning and support for various types of multimedia services to meet different multimedia QoS requirements.

- The heterogeneity of Applications.

Along with this convergence includes integration of technics used by media service provider and media service consumer. Media providers are generally uses historical technique of broadcasting and video streaming which are very time consuming and complex process. It also results into more latency. While now days media consumers are using technology of publishing and sharing media file. [4]

Convergence of media consumer and provider demands new strategy for content administration for two reasons

1. Fundamental changes in media content flows. Earlier it was few-to-many which is now many-to-many massive consumer servers.
2. Disorganized generation of video content with diverse quality and resolution fluctuations.

Point to point integration is not possible in case if widely spread media data. It only can provide basic SaaS to SaaS connectivity, but they are not sophisticated or flexible enough to handle more complex scenarios. Cloud integration solutions must be able to support a variety of integration flows moving in both directions across the cloud and enterprise and scale up as the number of endpoints increases.

2.2. Scalability and Expandability

Besides the heterogeneities that have already existed and will emerge, the media cloud needs to be able to deal with the dramatically increasing video contents. Every second millions of video files are accessed via internet. Therefore, to be a successful media cloud platform, its architecture must be designed carefully to adapt to the continuously increasing amount of media content, and need to be adaptable for the new applications and services. There are so many formats available for media file and each of them have different standards and protocols. So a media cloud must adapt functionality to access and process all type of media. In general a cloud must expand to support any media format and any media outlet.

2.3. Finding appropriate application for media.

The applications around media cloud involve in various types of media services, including TV, movies, music, games, and other information and multimedia services. The most important goal of an application is to provide excellent user experience to consumers. Specifically, the following experiences [5] are more important for today's successful applications:

- The informative experience.

User must get appropriate information as and when he needs. Information must be accurate and not false. Whatever a media tries to convey must be in such way that user gets enough information about that.

- The ubiquitous experience.

- A media file accessed from wherever and at any time, it must give the same result. A file must be universe in terms of content, quality and information. It must be independent of place from where to access and device.

- The personalized experience.

User must get media with minimum delay and best quality so that he/she feels that it is their personal media file. i.e. intermediate processes must be transparent to users.

- The social experience.

User must get a social experience from accessing media content such that he becomes aware of current affairs in society. All news and highlights must be given to user according to his social

environment. Imagine a French man surfing for news and getting news from Afghanistan which is not understandable by him.

These experiences are correlated to each other and are particular suitable for media cloud. Large and comprehensive system does not mean success. The quality of experience (QoE) might be more important. Finding suitable and innovative applications, implementing the system at modest cost, and attracting the specific target consumers might be a smarter way.

2.4. Reliability

Reliability refers to tolerate unpredictable mobile links. In case of media cloud there are chances of using media in infrequent manner especially in journalism and entertainment. In such case a media cloud must be able to handle the access of cloud from all over globe. The media delivered to clients must be correct in terms of quality, duration and less latency. Media cloud provider should be also aware of redundancy of media files in cloud as same media files are often uploaded by different users. In today's mobile world it is possible that different devices may support different formats of media. A cloud must be able to deliver an appropriate format to the requested device.

2.5. Security

Two main issues exist with security and privacy aspects of Cloud Computing:

1. Loss of control over data
2. Dependence on the Cloud Computing provider

These two issues can lead to a number of legal and security concerns related to infrastructure, identity management, access control, risk management, regulatory and legislative compliance, auditing and logging, integrity control as well as Cloud Computing provider dependent risks.

Some of the risk due to loss the control over data are due to the lack of transparency for customers on how, when, why and where their data is processed. This is in opposition to the data protection requirement that customers know what happens with their data.

Another reason of violating security policies are because Cloud Computing is a service, it has to be accessed remotely. The connection between the Cloud Computing provider and customer is not always adequately protected. Security risks that threaten the transfer line include eavesdropping, DNS spoofing, and Denial-of-Service attacks.

2.6. Authoring and Mashup

Multimedia authoring is the process of editing segments of multimedia contents, while mashup deals with combining multiple segments from different multimedia sources.

Tools for this are categorized into offline tools and online tools where the former provides more editing functions, but the client usually needs editing software maintenance. The latter provides fewer functions, but the client need not bother about its software maintenance.

2.7. Media Processing

One need to encode media files with cloud computing resources. Protocols and other formats used by cloud may differ from media content provided. It must be encoded according to architecture of cloud. Next required process is to transcode it with balanced cloud and edge resources. Meta data should be processed for media content. To do all such process there are several issues faced by developers of media cloud. Following are major research issues for media processing

- Parallel algorithm design for cloud computing^[6]
- Trade-off between computation and media distortion
- Trade-off between encoding performance and energy efficiency
- Trade-off between distortion and delay tolerance

2.8. Cloud-Based Media Distribution^[7]

There must a cost-optimized media distribution from cloud for any type of media content. Distribution of media content especially in case of emergency must not affect quality of file. For distributing media a distribution tree has to be designed and managed. Distribution storage and caching is equally important. The same way the route of media content has to be chosen properly.

Challenges faced for this phase are

- Distribution tree algorithm, with respect to different cloud pricing models
- Erasure-based cloud storage algorithm
- Distributed content routing and discovery algorithm
- From core storage to edge distributions

3. Legal Issues in Cloud Computing^[8]

In the same way that the electricity one uses may have been generated in another country where costs are lower, the computer processing power or storage one buys via a Cloud service may be based in another country, or indeed may be divided between multiple countries. But as well as the cost and efficiency advantages brought in this arrangement, this also raises vexing legal issues in the case of Cloud Computing arising out of exporting customers data abroad; also, the Cloud Services Provider has to contend with the Legal Systems under different Jurisdictions with not so much of visibility as to where the Data resides and how it is routed to the End User while passing through different Legal Jurisdictions. Again, vexing Legal Issues relating to ownership of data and liability for its loss or misuse have to be dealt with by the Cloud Service Providers. The legal issues differ from those arising from conventional outsourcing or hosting^[8]. A traditional data hosting or server hire contract may have involved use of someone else's storage or computer. But it would normally have been clear who you were dealing with and where you're rented resources were located. Such arrangements were also unlikely to have been established on a casual or informal basis. With Cloud computing, however, the location(s) of your data may be unclear, possibly even unidentifiable and it is also much easier to set up such an arrangement.

3. Conclusion

Media cloud provides a cost-effective and powerful solution for the coming tide of the media consumption. In this paper we have first represents brief detail about Media cloud. After reviewing more about media cloud we conclude with few challenges faced while developing media cloud. Those challenges include all phases from finding proper media file from provider to deliver it to the appropriate user. There are so many research issues available for making this media cloud cost effective and reliable.

4. References

- [1] "Media Cloud: When Media Revolution Meets Rise of Cloud Computing", Mingfeng Tan, Xiao Su in 6th IEEE International Symposium on Service Oriented System Engineering 2011.
- [2] "New Media Cloud Computing: Opportunities and Challenges", P. Sasikala Madhya Pradesh, India in International Journal of Cloud Applications and Computing Volume 3 Issue 2, April 2013
- [3] "Mobile Multimedia Meet Cloud: Challenges and Future Directions" Chang Wen Chen in ICME-2012
- [4] "Multimedia cloud computing", "Wenwu Zhu, Chong Luo, Jianfeng Wang, and Shipeng Li", in IEEE SIGNAL PROCESSING MAGAZINE MAY 2011
- [5] "B. D. Johnson, Screen Future: The Future of Entertainment, Computing and the Devices We Love: Intel Press, 2011
- [6] F. Zhenman, Y. Donglei, Z. Weihua, C. Haibo, and Z. Binyu, "A comprehensive analysis and parallelization of an image retrieval algorithm," in Performance Analysis of Systems and Software (ISPASS), 2011 IEEE International Symposium on, 2011, pp. 154-164
- [7] "Cloud Mobile Media: Reflections and Outlook", Yonggang Wen, Senior Member, IEEE, Xiaoqing Zhu, Member, IEEE, Joel J. P. C. Rodrigues, Senior Member, IEEE, and Chang Wen Chen, Fellow, IEEE
- [8] "Mobile Cloud Computing: Implications and Challenges", M.Rajendra Prasad , Jayadev Gyani, P.R.K.Murti; in Journal of Information Engineering and Applications www.iiste.org
ISSN 2224-5782

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Recent conferences: <http://www.iiste.org/conference/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

