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Optimized Delay of File Accessing using Raptor Code System in Cloud Computing

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ABSTRACT

Distributed computing is a collection of IT benefits that are given to a user over an organization on a rented hypothesis and with the aptitude to range up or down their administration necessities. It points of interest to specify yet a couple of incorporate adaptability, versatility, adaptability, productivity and outsourcing non-center exercises. Even though the probable increases accomplished from the spread computing, the associations are reasonable in tolerating it because of protection issues and difficulties related with it. Handing over critical information to another organization is troubling; with the end goal that the buyers should be careful in understanding the dangers of information breaks in this new condition. It presents assessment of the distributed computing protection issues and difficulties concentrating on giving information seclusion along high necessity of information accessibility in cloud innovation. Fountain code based distributed storage space framework gives steady online stockpiling agreement through putting unlabeled substance obstructs into numerous competence hubs. Raptor Code (RC) is one of the well known fountain codes for capacity frameworks because of its effective recuperation. Be that as it may, to pledge high achievement unraveling of fountain codes based competence, recovery of extra parts is required, and this requirement could present extra postponement. Presently demonstrate that various stage recoveries of pieces are successful to diminish the document recovery delay. Presently first build up a defer show for different numerous stage recovery plans relevant to our thought about framework. With the created display, we consider ideal recovery plans given necessities on progress decidability. Our numerical outcomes propose an essential tradeoff between the document recovery delay and the objective likelihood of fruitful record disentangling, and that the record recovery postponement can be altogether diminished by ideally booking bundle asks for in a multi-arrange form. The strategy executes on CloudSim 4.0.1 implement kit, which is propose in NetBeans 8.2. The result exhibits that it gives enhanced solid record recovery process stood out from supplementary unsurprising calculation to limit CPU time.

KEYWORDS: *Fountain-code, Raptor Code, file retrieval delay, cloud computing, CloudSim 4.0.1, Data Confidentiality*

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I. INTRODUCTION

Cloud computing is witnessing rapid innovations in the recent years. It has two primary assignments putting away and getting to information and projects by methods for Internet as opposed to use of a PC's hard drive. The element cloud introduces a broad scope of administrations. It diminishes the intricacy of the systems, makes arrangement for customization, adaptability, proficiency and so forth. Besides, the information stored on cloud is generally not easily lost. In view of its on-request nature, you could normally purchase distributed computing a similar way you would purchase power, telephone utilities, or Internet access from a service organization. It is so easy with the cloud because one can add extra services (or take them away) at a moment's notice as the business needs change. As cloud innovation is ending up increasingly broad, the difficulties like spilling of touchy information [1], hacking [2], and decoded information in danger [3– 5] associated with keeping up the innovation is additionally expanding. Cloud security the policies, technologies, controls etc that are used to protect the data, the various applications on the cloud and the associated infrastructure, are becoming an integral field of research in the field of Network Security, and more broadly in Computer Security. The advancement of the Cloud Security approaches is similarly imperative to stay aware of the cloud issues. As a sort of developing business computational model, Cloud Computing conveys calculation errand on the asset pool which comprises of a substantial number of PCs and in like manner the application frameworks pick up the calculation working

quality, the storage room and programming administration as per its request. The working of distributed computing can be seen by two particular highlights One is the cloud framework which is the building obstruct for the upper layer cloud application. The other is the cloud application. Distributed computing has accomplished two vital objectives for the disseminated figuring by the methods for three specialized strategies. High Scalability the cloud foundation can be extended to vast scale even to a large number of servers and high Availability with the goal that the administrations are accessible notwithstanding when a significant number of servers come up short.

II. RELATED WORK

Haifeng Lu et. al (2017), Distributed storage frameworks give a versatile online stockpiling answer for end clients who require adaptable measure of storage room however don't wish to possess and keep up capacity foundation. Contrasted and customary information stockpiling, distributed storage has a few favorable circumstances. For instance, end clients can get to their information anyplace through Internet without making a big deal about conveying physical capacity media.

Samson Akintoye et. al (2017), As of late, distributed computing is exceedingly grasped and considered an absolute necessity have in the IT world. Distributed computing is a figuring worldview, where a huge pool of frameworks is associated in private, open or mixture systems, to give powerfully versatile foundation to processing assets.

Raghavendra S et. al (2016), Disseminated processing is a consistently creating field of advancement. At all intricate terms, disseminated processing suggests securing and getting to data and undertakings over the Internet instead of your PC's hard drive. The cloud offers a collection of organizations. It diminishes the eccentrics of the frameworks, makes game plan for customization, adaptability, efficiency et cetera.

Ashutosh et. al (2016), Conveyed figuring is a way to deal with manufacture the breaking point or incorporate capacities of IT dynamically without placing assets into new establishment, planning new work constrain, or allowing new programming. It widens Information Technology's (IT) existing capacities. Over the latest couple of years, appropriated processing has created from being a promising business thought to one of the rapidly creating parts of the IT business.

Pritam et. al (2016), This paper exhibits the overview on information stockpiling and recovery in distributed computing. In this paper the investigation on extension and security issues identified with information stockpiling and data recovery in distributed computing is finished. Information stockpiling and recovery with information security is average issue in the present situation. The principle goal of distributed computing is to empower clients with restricted computational assets to outsource their vast calculation workloads to the cloud.

D. Pratiba et. al (2016), Distributed computing is an exuding innovation enabling clients to perform information handling, use as capacity and information affirmation administrations from around the globe through web. The Cloud specialist co-ops charge contingent upon the client's use. Forcing secrecy and adaptability on cloud information expands the many-sided quality of distributed computing. As touchy data is brought together into the cloud, this data must be encoded and transferred to cloud for the information protection and productive information usage.

III. PROBLEM IDENTIFICATION

The basic problem identification is as follows

- **Large Occupied Storage:** In distributed storage system, large amount of storage could be occupied by stored file**.**
- **High Delay Time:** Delay time in decoding stage of file retrieval is high than probability of file retrieval model become low.
- **Low probability in multiple stage retrieval process:** When request of file perform at multiple stages than probability of file retrieval goes down. Normally, in two or three multiple stages retrieval process probability becomes down up to 15%.

IV. METHODOLOGY

The basic algorithm of proposed methodology RCCS is as follows

DT = RCCS (nF)

Input:

DT = Delay Time

Output:

nF = Number of file.

Step 1 : Select the file for Encoding purpose.

Step 2 : Considered the cloud using Raptor Code method for decoding it involves two phase.

1. Fragment the file in n based and generates order with following formula

   m = nlog (n)

Where m is the order of fragment file and n is the number of fragment of file.

2. In second phase the fragment file convert in to generic Raptor code which is the extension of LT code.

Step 3 : Now obtained code is optimized throw optimization technique like generic algorithm. The process of optimization is as follows,

1. Select the RC code of each fragment of file and generate evaluation of that code.
2. Now currently and evolution Raptor code are perform with Selection, Cross over and Mutation process.
3. Now finally optimized Raptor code of Encoding file being stored in cloud.

Step 4 : Now cloud storage stored the file in optimized level now perform decoding process as follows,

1. Select the location of cloud for retrieving file.
2. Convert RC code in to generic code through redundant nodes of RC code.
3. Calculate space, overhead, cost and delay time of retrieval file.

IV. RESULTS AND ANALYSIS

Now first investigate the file-retrieval delay D1(n) for n RC packets in the one-stage request case. This delay consists of two parts as shown in Figure 5.1. The first part arises from the traffic arriving before the RC request and the second part arises from the traffic arriving after the RC request.

A. Delay Analysis for One Stage Request

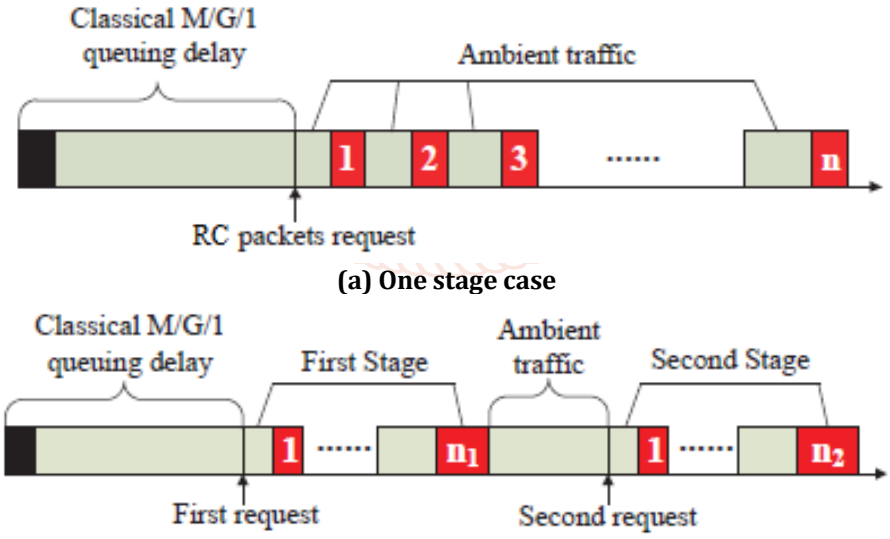
In this analysis, we assume Poisson arrival process for ambient traffic and RC-coded packets. The first part only contains ambient traffic and it is treated as a classical M/G/1 queue with delay denoted by W. The second part can be further divided into two sub-parts. Firstly, it contains a constant which is the transmission time of n. RC packets, which can be derived as $\frac{nl_{RC}}{r}$. The rest is the time to process the ambient traffics which arrive at the portal during the inter-arrival time of each RC packet. This part is denoted by T. Thus, the delay $D_1(n)$ can be expressed as

$$D_1(n) = W + \frac{nl_{LT}}{r} + T$$

Taking an expectation on both sides, we obtain

$$\begin{aligned}
\overline{D}_1(n) &= \overline{W} + \overline{T} + \frac{nl_{LT}}{r} \\
&= \frac{\lambda_a(\sigma^2 + l^2)}{2r^2(1 - \frac{\lambda_a l}{r})} + \frac{\lambda_a l}{r}\sum_{i=1}^{n}\tau_i + \frac{nl_{LT}}{r} \\
&= \Gamma + \frac{\lambda_a l}{r}\sum_{i=1}^{n}\frac{1}{i\theta} + \frac{nl_{LT}}{r} \\
&\simeq \Gamma + \frac{\lambda_a l}{r\theta}(ln(n)+1) + \frac{nl_{LT}}{r},
\end{aligned}$$

Where Γ is a constant when the parameters for the traffic are determined.



(a) One stage case

(b) Two stage case

Figure 1: Components of delay

There are three terms in above equation, Γ the logarithm term and the linear term. In order to ensure the portal has a stable state, λ_a should be less than 100 packets per second under our setting stated. Under this condition, the order of magnitude of Γ is 10^{-3}. The number of source symbols k usually exceeds 100 which implies the number of requested packets n is also larger than 100. Thus, compared to the linear term which has the order of magnitude equal to 10 or 10^2, Γ is negligible. If we assume that λ_a and θ are comparable (*e.g.* $\frac{\lambda_a}{\theta} \approx 1$), the logarithm term has the order of magnitude equal to 10^{-2} which is also negligible. As a result, the linear term $\tilde{D}_1 = \frac{nl_{RC}}{r}$ can be used to approximate $D_1(n)$.

Table 1: Delay Analysis in between of LTCS [1] and RCCS(Proposed) for one stage Request Scheme.

NO. OF PACKETS	LTCS[1]	RCCS (PROPOSED)
100	1.75	1.31
200	2.13	2.07
300	3.27	3.19
400	4.19	4.06
500	5.87	5.42
600	6.14	6.03
700	7.83	7.31
800	8.2	7.98

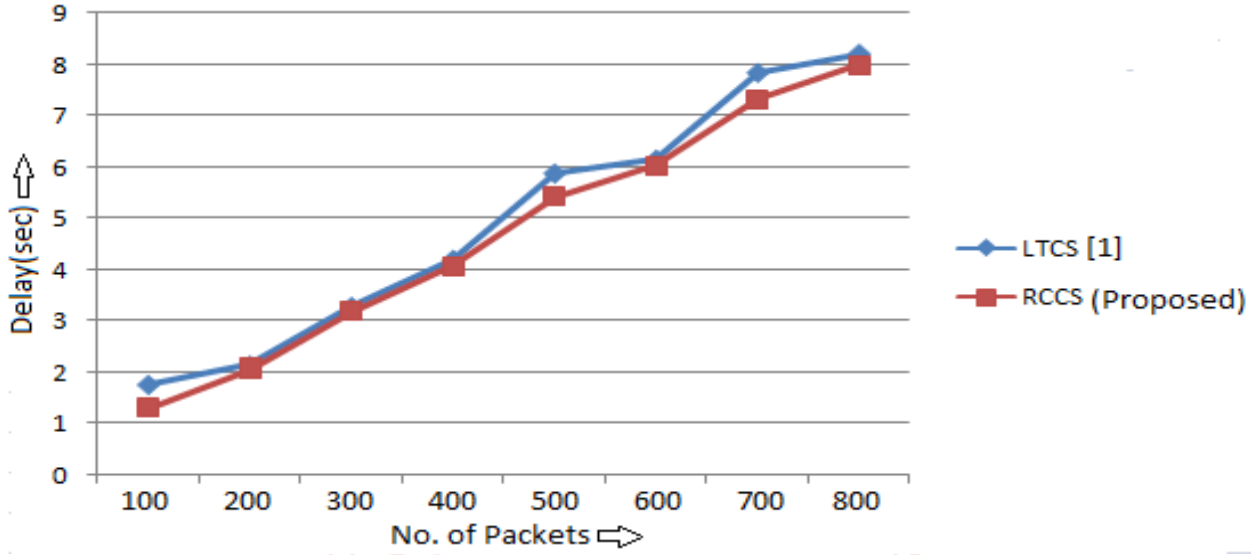


Figure 2: Graphical Analysis in Between of LTCS [1] and RCCS (Proposed) for One Stage Request Scheme.

B. Delay Analysis for Multiple Stage Request

Now first investigate the file-retrieval delay for the two-stage request scheme. The packet arrival process is illustrated in Figure 5.1(b). Suppose in the first stage, the user requests n1 RC encoded packets. The delay for the first stage is D1(n1). After decoding these n1 packets, if the user fails to decode the original file, it continues to request the n2 packets. Here we assume that during the decoding process of n1 packets, the transmission queue in the portal has already returned to the steady state. This assumption is reasonable since it does take some time for the user to determine if the n1 RC encoded packets are decodable. Thus, the delay for the second stage is identical to the first stage except for the number of encoded packets the user requests. As a result, the overall file-retrieval delay for the two stage request case is given by

$$\begin{aligned} D_2(n_1,n_2) &= f_k(n_1)D_1(n_1) \\ &+ (1-f_k(n_1))(D_1(n_1)+D_1(n_2)) \\ &= D_1(n_1)+(1-f_k(n_1))D_1(n_2), \end{aligned}$$

where fk(n) is the probability of successful decoding with n RC encoded packets.

Table 2: Delay Analysis in between of LTCS [1] and RCCS (Proposed) for Two stage Request Scheme

NO. OF PACKETS	LTCS[1]	RCCS (PROPOSED)
400	7.18	6.89
450	7.1	6.81
500	7	6.82
550	6.48	6.42
600	6.08	6.06
650	6.6	6.24
700	7	6.79

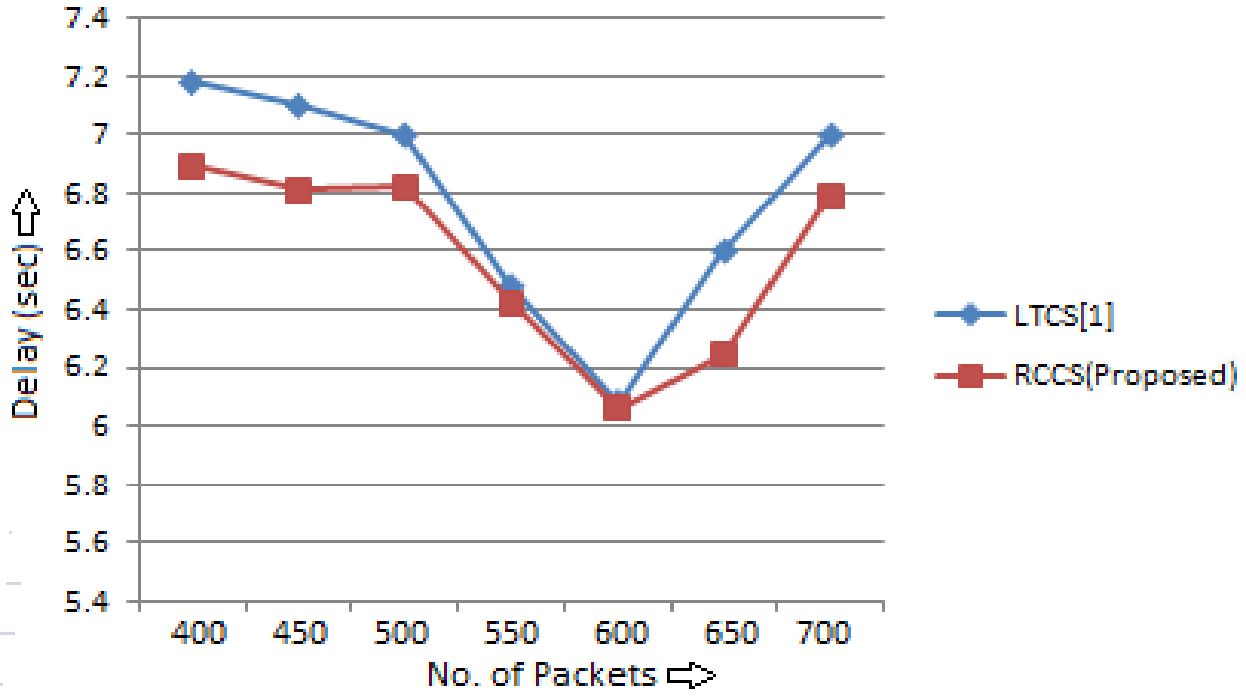


Figure 5.3: Graphical Analysis on Between of LTCS [1] And RCCS (Proposed) for Two Stage Request Scheme.

V. CONCLUSION

1. In proposed scheme encoded file is decomposed in multiple packet and stored multiple location of cloud storage, hence allocated file occupied minimum storage space.
2. To reduce the delay time in decoding stage, file retrieval process is encoded in the form of RC code. Then decoding stage (one stage and multiple stages) performs smoothly.
3. Delay time reduce by 23% (for one stage) and 4% (for multiple stage) significantly.
4. At multiple stage retrieval process, position distributions, queuing theorem applied for scheduling the packet of multiple file in decoded process. Than probability of retrieval process will be increase as pr size of retrieval file.
5. RC based cloud storage scheme perform very well as compare them LC based cloud storage.

VI. SCOPE OF FUTURE WORK

1. Cloud storage can be used for IaaS scenario and also analyzed the energy of cloud resources in retrieval process.
2. Retrieval process of file from cloud can be extends with various encoding scheme.
3. We can extend our work in distributed environment.

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