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# EPACK: Enhanced Packet Forwarding and Redundancy Elimination Optimization algorithm on Cloud

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## ABSTRACT

**Cloud computing and its mechanism to transfer the data, managing its component is an important process for complete process. Packet forwarding, data storage, transmission over the different channel takes process in user activity. Recent technique PACK takes an advantage of chunking scheme with execution of SHA-1 as security signature approach. Still there are issues with the PACK such as in finding high level prediction with efficient signature scheme. The algorithm exhibit reliable prediction over the data. In this paper our work presented as EPACK, which is the extension version of PACK to identify redundancy prediction over the transmitted data. The algorithm makes use of Meta information, topical relation in between the file parameters, SHA-2 for signing information and outperforms the high level prediction as compare to existing technique. The experiment performs over the PACK & EPACK algorithm with comparison parameter by performing data transmission using JDK framework. The proposed scheme and result comparison analysis shows the efficiency of our approach while comparing with PACK algorithm.**

***Keywords- Cloud computing, redundancy prediction, EPACK, Signature algorithms.***

## I. INTRODUCTION

Cloud computing and its data transmission strategy plays an important role. The PaaS (platform as a service) mechanism. Data storage and redundancy over the large existing data is still an observable phase. Bandwidth optimization, its proper usage, data analysis need to understand over the time [1].

Redundancy in cloud computing can be defined as the supplying of duplicate copies[2] of various data, equipment, systems, or the like, to be used in the event that part of one's cloud computing system fails or cannot be accessed. This redundancy is made available by having fully replicated data several times on multiple computers

or units involved in the same data center. With cloud, there is no longer a need to construct a pricey "*high available redundant system*," as one would need to do with a traditional IT operational system, because a fail-first mentality has been inherently built into the structure of cloud computing. The cloud was structured on the understanding that certain components in the system will give out at some point.

Cloud computing is a recent technological development in the computing field in which mainly focused on designing of services which can be provided to the users in same way as the basic utilities like food, water, gas, electricity and telephony. In this technology services are developed and hosted on the cloud (a network designed for storing data called datacenter) and then these services are offered to users always whenever they want to use. The cloud hosted services are delivered to users in pay-per-use, multi-tenancy, scalability, self-operability, on-demand and cost effective manner. Cloud computing is become popular because of above mention services offered to users. All the services offered by servers to users are provided by cloud service provider (CSP) which is working same as the ISP (Internet service provider) in the internet computing.

## II RELATED WORK

Traffic redundancy prediction and its elimination over the cloud environment have been proposed by different authors. Thus some related work and approach is being discussed to understand methodology .

In paper [3] PACK algorithm for traffic redundancy elimination system is presented. In particular system a PACK (Predictive ACK's) an end to end redundant data elimination system to reduce the redundancy from the traffic. The algorithm makes use of several components and performs the complete process. A chain scheme of chunk formation, passing it through the stream and further the signature SHA-1 is introduced by the author.

PRED, PRED-ACK and message sharing approach over the cloud data owner and user is being simulated with cloud network. Further a redundancy prediction over the algorithm is being performed by the publisher.

A technique call as CORE: copperative end to end traffic redundancy elimination is also proposed.Here redundancy is removed at two levels at second level fine level of granule redundancy is checked [4].

A lightweight technique give more efforts on client side by comparing already received data signature with newly received data. This technique finds the duplicate data before download it resolves problem like traffic optimization, saves time cost can be reduced.[5]

In 2015 Miss .Mane VIdya Maruti, Prof. Mininath K.Nighot proposed a technique Data Deduplication using hybrid cloud. File Level Duplication as well as content level duplication is checked. Here content level check is performed where all file content are matched and check based on hash function. if redundancy is determined there then display message found duplicate data If a user request to access data on public cloud ,he need to submit information to

private cloud then it provide a file token and user can get access to files reside on public cloud[6]

In 2014 S. Ihm, K. Park, and V. Pai, proposed a method call as TRE (Traffic Redundancy and Elimination).

This novel-TRE has significant features like detecting the redundancy at the client, repeats appear in chains, matches incoming chunks with a previously received chunk chain or local file and sending to the server for predicting the future data and no need of server to continuously maintain client[7].

Further problem formulation with existing scenario is presented:

1. High consumption of the bandwidth is simulated due to content level processing over the cloud network and its usage.
2. A low level signature is used which can be broken by the bots.
3. An multiple high level prediction based on more file property parameter is not being used by the mechanism such as metadata.
4. A bandwidth reduction and optimization is not being performed.
5. There is no concept of security

## III EPACK ALGORITHM

In this Research Work analysis of proposed work for redundancy detection and prediction techniques were used where the algorithms are being investigated:

1. PACK algorithm.
2. EPACK algorithm.

EPACK algorithm take use of file property and its various component properties which always associate and exhibit remain predictive over the time. EPACK algorithm makes use of those properties, their similarity measure with the existing stored file over the network data. The Meta property of the stored and managed data is being used for the proposed EPACK algorithm prediction. An approach for the efficient signing scheme is also opt out for data processing and evaluation. An SHA-2 based hashing scheme utilized in order to process with the proposed work methodology.

Algorithm Pseudo Code:

In EPACK algorithm several components were included, here algorithm procedure is presented.

***Input: Data packet, receiver address.***

***Output: redundancy evaluation, result evaluation.***

***Algorithm Begins:***

***Receiving user input packets();***

***If(data packet received)***

***{***

***HECC();***

***Packet transmission ();***

***predict Attempting();***

***Meta property evaluation ();***

***SigSha2();***

***EndIf;***

***}***

***If(PRED-ACK)***

***{***

***observePred();***

***processPredACK();***

***Parameter computation & evaluation();***

***EndIf;***

***}***

The above pseudo code exhibit the proposed work methodology procedure in which the Meta extension and signature work is being observed and performed. EPACK used TCP ACK, Prediction algorithm approach using similarity measure and PRED ACK scheme over the scenario. Tracing of the complete data packet transmission from sender to receiver, its traffic redundancy and packet data optimization is performed by the proposed algorithm.

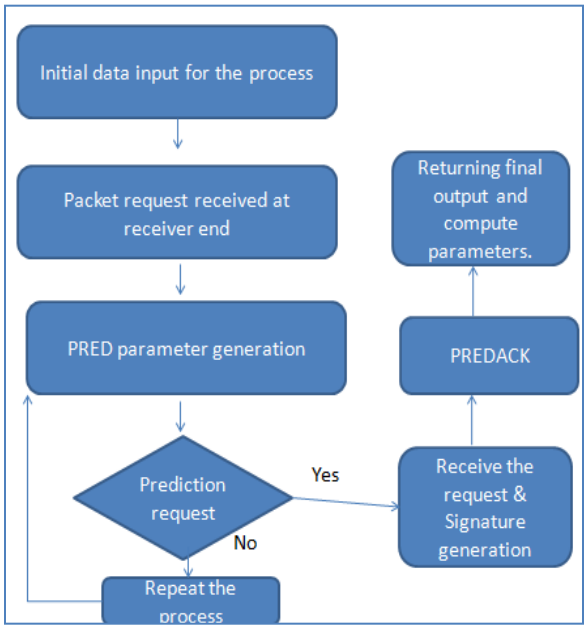


Figure 1: Flow diagram of workflow

The figure 1, above demonstrate the complete flow diagram and process for algorithm.

Thus it differentiates with the existing mechanism in several manners such as prediction matching technique, signature generation and processing approach as well as bandwidth reduction over the large packets. The hyper elliptic curve cryptography algorithm is also used here for security purpose

## IV IMPLEMENTATION

In order to perform simulation over the framework. All the experiments were performed using an i5-2410M CPU @ 2.30 GHz processor and 4 GB of RAM running windows 8. The discussed redundancy prediction algorithms were implemented using language Java. Proposed as well as existing algorithms were applied one by one in same data. At last, comparative study was prepared for all algorithms.

A PaaS (platform as a service) environment using the Tomcat 8, apache framework with relational Dataset for indexing is being used.

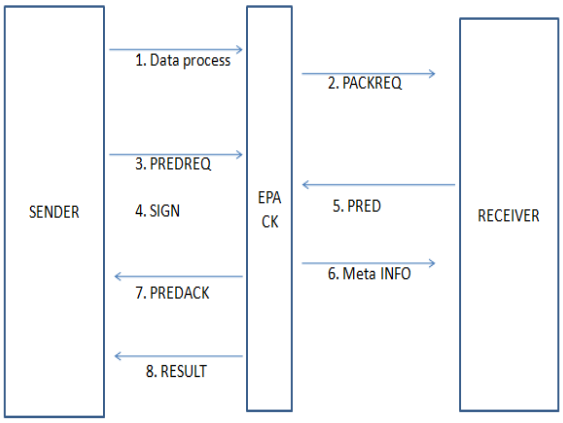


Figure 2: Implementation scenario framework

In the figure 2, above the complete scenario and workflow steps been simulated , thus the data process

generation, request prediction generation , acknowledgement of the data and final prediction with result analysis is presented over the implementation scenario.

## V RESULT ANALYSIS

The existing PACK algorithm along with the proposed EPACK is presented and experiment results observed in several parameter category.Computation parameter for the evaluation and study such as computational cost, computation time, bandwidth prediction, traffic volume is being investigated.Computation time & Computation cost– it is the computation time across the complete transmission over a single file. Whereas the cost can be calculated by assuming the time consumed and bandwidth consumption over the period multiply by its individual unit cost.

Computation time = finishing time in ms- initial time in ms. , ct= ft-it; (1)

Computation cost = (finishing time in ms- initial time in ms)* (bandwidth cost per unit)* (bandwidth consumed)* (computation cost per unit),

CC = (ft-it)*(bdwc*bw)*ccpu (2)

Thus the above equation (1) and (2) used by the system to compute the result parameter comparison over the PACK and EPACK algorithm.

A result comparison analysis is shown here to give advantage of our work.Redundancy Analysis: A file data transmission and redundancy analysis over the cloud is being performed and compare. A no of parameters are considered according to which comparison is done between existing technique and proposed technique

Table 1: Comparison analysis over file transmission in different environment

| Parameters | PACK | EPACK |
|---|---|---|
| File ID | 113 | 113 |
| File Size | 5557 kb | 5557 kb |
| Bandwidth | 38410 kb | 34248 kb |
| Computation time | 5 seconds | 2 seconds |
| Traffic volume | 27.509 MB | 33.445 MB |
| Traffic cost | 48% | 43% |
| Chunk speed | 1111 kbps | 2778 kbps |

The above table 1, comparison over the different parameter and same file is monitored.

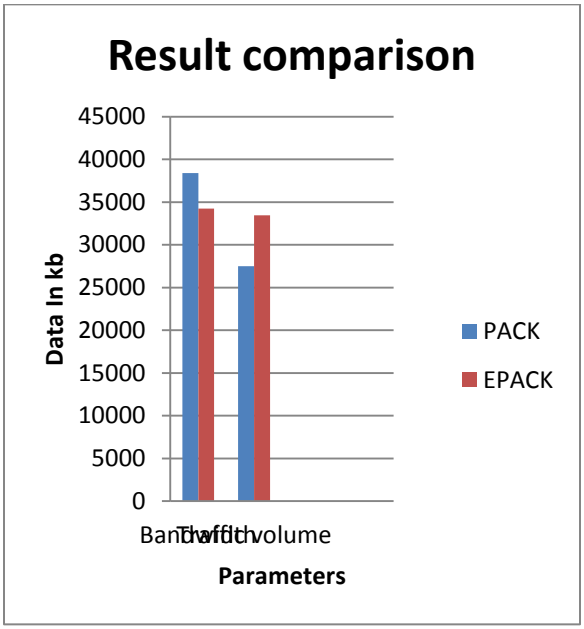


Figure 3- Comparison analysis of PACK and EPACK algorithm.

The further figure 3, gives the comparison of bandwidth and volume. Also the figure 4, demonstrate the comparison analysis in between computation time and cost.

The above comparison shows the graphical analysis of the proposed work with existing work.

The result analysis shows the efficiency of our work and thus it can be implemented over the time in real time for better redundancy prediction and bandwidth optimization.

## VI CONCLUSION AND FUTURE WORK

Cloud computing and traffic redundancy plays an important role today in internet Era. In this Paper work have conducted various experiment of different algorithm and observed results, by considering all features in data transmission on cloud. Our works have analyzed the result from PACK & EPACK algorithms that select relevant features for the proposed frameworks. A multiple format data file used for evaluating the performance of system. Also based on our observation it can notify that EPACK approach defined by us is an effective approach in order to retrieve outlier which was perform on the data transmission and efficient redundancy prediction. In future, we can replace the signature scheme such that packet security as well as data transmission makes it effective over the time parameter as well as cost. Further optimization of EPACK can be done to apply with auto report generation module over the time.

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