A Research On Enhancing Data Reliability using Multi-Generation Mixing for Decoding In Cloud Computing

Jashesh Patel[1], Saket Swarndeep[2]

[1] *PG Scholar, Computer Engineering, L.J.I.E.T., Gujarat, India*
[2]*Assistant Professor, Dept. of Computer Engineering, L.J.I.E.T., Gujarat, India*

ABSTRACT

Wireless access networks constitute an important part of mobile cloud computing. Using mesh networks is a promising solution to quickly provide connectivity infrastructure for cloud service access. While mesh networks can be easily set up, the wireless nature of the links interconnecting mesh routers compromises the network performances. Due to the broadcast nature of wireless networks they have been a natural platform for applying Network Coding (NC). Wireless networks can benefit significantly from NC due to their broadcast nature and the opportunity of enhancing bandwidth utilization. In this survey, a study of different network coding theories have been carried out and a comparision has been done.

Keyword: - Data Reliability, Network Coding, Multi-Generation Mixing, Cloud Computing.

1. INTRODUCTION

What Is Cloud Computing?

- Cloud Computing is an innovative technology that is revolutionizing the way we do computing. The key concept of cloud computing is that you don't buy the hardware, or even the software, you need anymore, rather you rent some computational power, storage, databases, and any other resource you need by a provider according to a pay-as-you-go model.

What is data reliability?

- Data reliability is a state that exists when data is sufficiently complete and error free to be convincing for its purpose and context. In addition to being reliable, data must also meet other tests for evidence. Computer-

processed data must meet evidence standards before it can support a finding.

2. RELATED WORK

[1] Distributed Cloud Storage Using Network Coding.

- The main idea of this paper is to store data in a distributed fashion over multiple cloud providers. This should help to increase reliability and resolve the privacy issues to some extent. Additionally, using random linear network coding makes storage more efficient in terms of storage space and time to retrieve the distributed data.

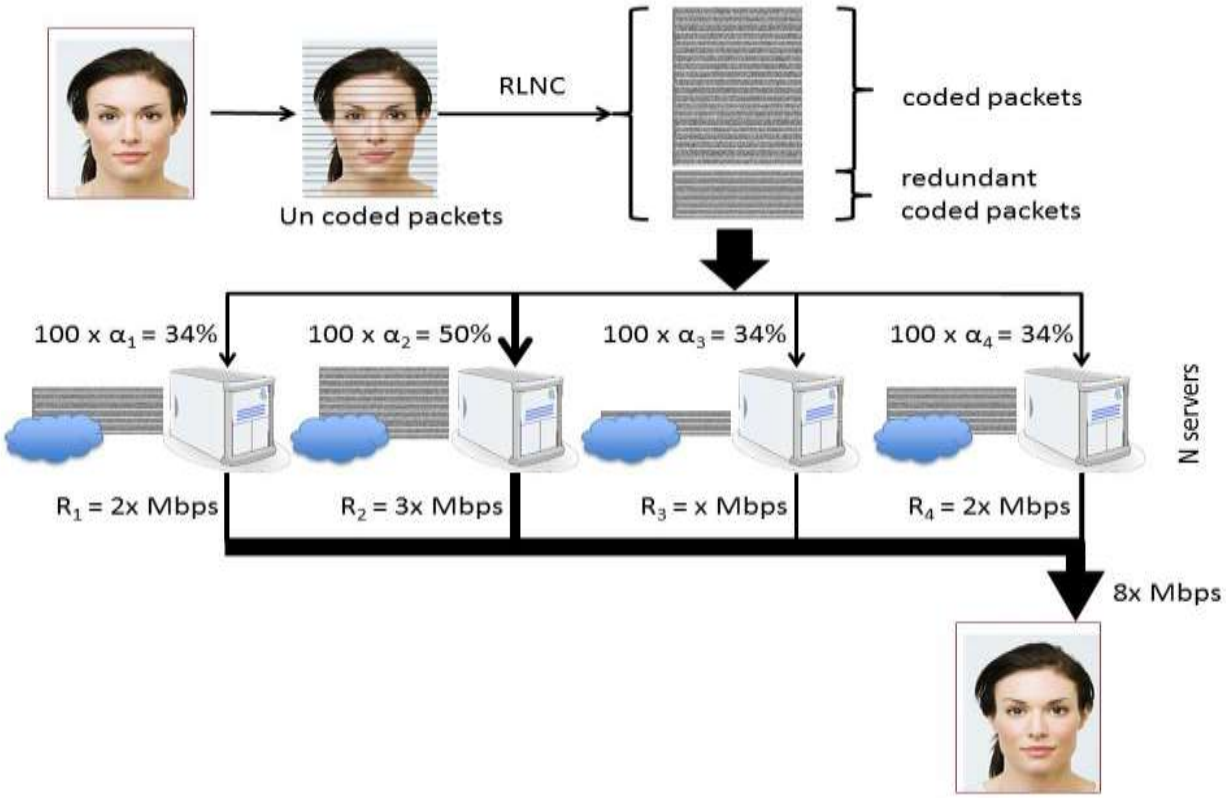


Figure 1 Main idea of distributed clouds with network coding

[2] A Secure Regenerating Code for the Fault-Tolerant of Distributed Networked Storage

- In this paper to solve the fault-tolerant of distributed networked storage. SRCS achieves the security of the regenerating code using the threshold public-key encryption with low redundancy and high efficiency. In the storage system based on the SRCS, the data owner shares his private key to a set of key servers and uses the storage servers to stores the data. Even if the attacker compromises all storage servers, he can't get the data. It shows that SRCS is secure in the semi-adaptive model using decisional BDHE assumption.

- In this paper, a secure regenerating code called secure regenerating code with semi-adaptive (SRCS) is proposed.

[3] Network Coding for Data-Retrieving in Cloud Storage Systems.

- In this paper, they transfer the perspective of study of based on MDS codes to that of optimizing MDS codes in order to improve the performance of data-retrieving, that is, from optimizing the system retrieving strategies to optimizing the coding schemes. We apply Network Coding to optimize the coding schemes and propose a new family of MDS codes, which reach optimal performance of data-retrieving .

[4] Network Coding with Multi-Generation Mixing: Analysis and Applications for Video Communication.

- In this paper, MGM-based NC improves the performance of real- time data communications under scenarios of sparse connectivity and high loss rates. Under such scenarios, practical network coding not only fail to achieve any improvements; on the contrary it may lead to performance degradations. The analytical as well as the simulation studies we present in this paper show major improvements that can be achieved in situations where practical network coding is not a viable option.

[5] Cooperation based Instantly Decodable Network Coding for Mobile Clouds

- In this paper the concern was to build a delay and throughput optimized network coding scheme with mobile cooperation for broadcast based Mobile clouds applications. Hence, after a deep literature study, we proposed a scheme that introduces the use of cooperation with Instantly Decodable Network Coding. In order to evaluate the proposition, they carried out simulation experiments to test it and compare it with relevant existing solutions. Finally, the results are very encouraging and the proposed scheme gives a satisfactory delay compared to the existing solutions.

A. Comparative Analysis

Sr. No.	**Paper Title**	**Methods/ Techniques**	**Advantages**	**Disadvantages**
1.	Network Coding for Data-Retrieving in Cloud Storage Systems.	Optimizing MDS Code, OPDRC	Improved performance of data retrieving using OPDRC Scheme	Format specific policy might not always make correct decisions in all scenarios.

2.	Distributed Cloud Storage Using Network Coding	Distributed storage techniques, Cloud Testbed	Less Cost, Reliability, Download Speed and Privacy	Extra delay in decoding
3.	A Secure Regenerating Code for the Fault-Tolerant of Distributed Networked Storage	Regenerating Code, SRCS, Fault-Tolerant	Guarantees the privacy of messages even if all storage servers are compromised	Considering only processing speed is not enough. Other factors need to be considered
4.	Network Coding with Multi-Generation Mixing: Analysis and Applications for Video Communication	MGM Based Network Coding, G-by-G network coding	Improves the flexibility for decoding generations incrementally.	Other parameters like performance is not considered
5.	Cooperation based Instantly Decodable Network Coding for Mobile Clouds.	Mobile Cloud, Instantly decodable network coding	Improvement in terms of packets delay and completion time of broadcast sessions.	The Channel between source and the user group is less reliable and requires much more power to compensate for the path loss

Table 1. Literature Comparison

3. PROPOSED WORK

In our research, we will develop Multi-Generation Mixing (MGM), which is a generalized approach for generation based network coding. With traditional generation based NC sender packets are grouped in generations where encoding and decoding are performed on packets that belong to the same generation. The proposed MGM framework allows the encoding among generations for the purpose of enhancing NC decode ability. With MGM in scenarios where insufficient number of encodings received of a generation, it is still possible to recover the generation using data encoded in other generations. We will develop MGM based technique and will demonstrate the improvements in data reliability achieved by MGM.

A. Proposed Flow chart of data publishing and retrieving

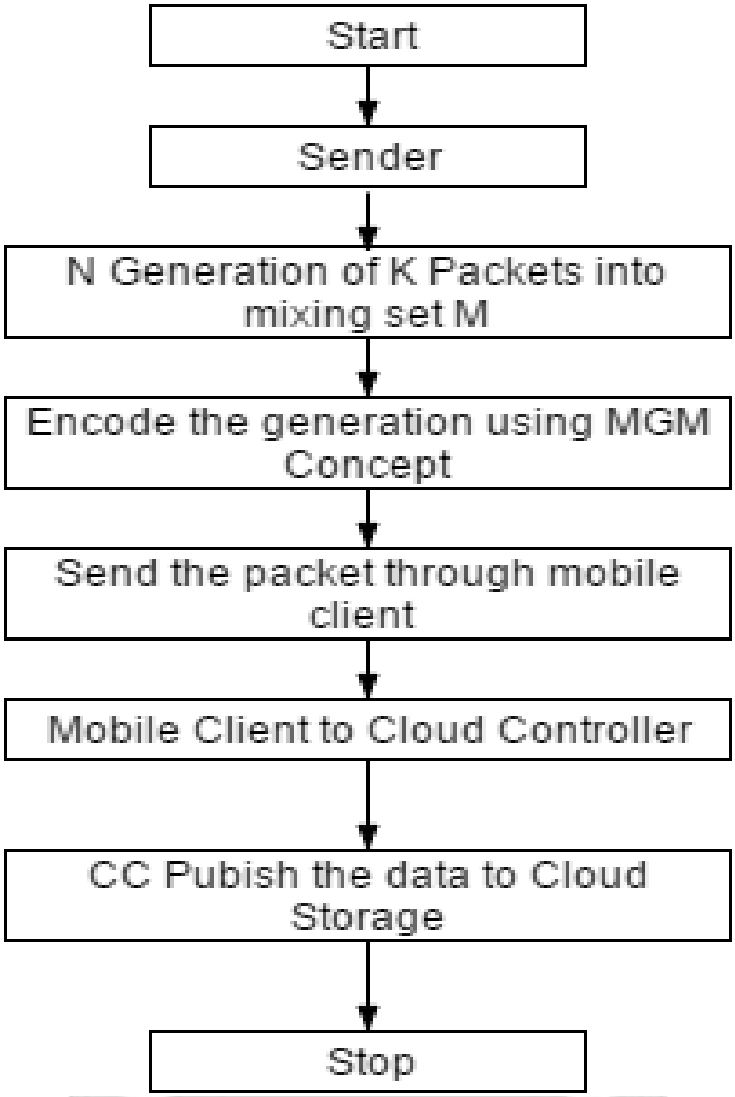


Figure 2: **Flowchart of data publishing**

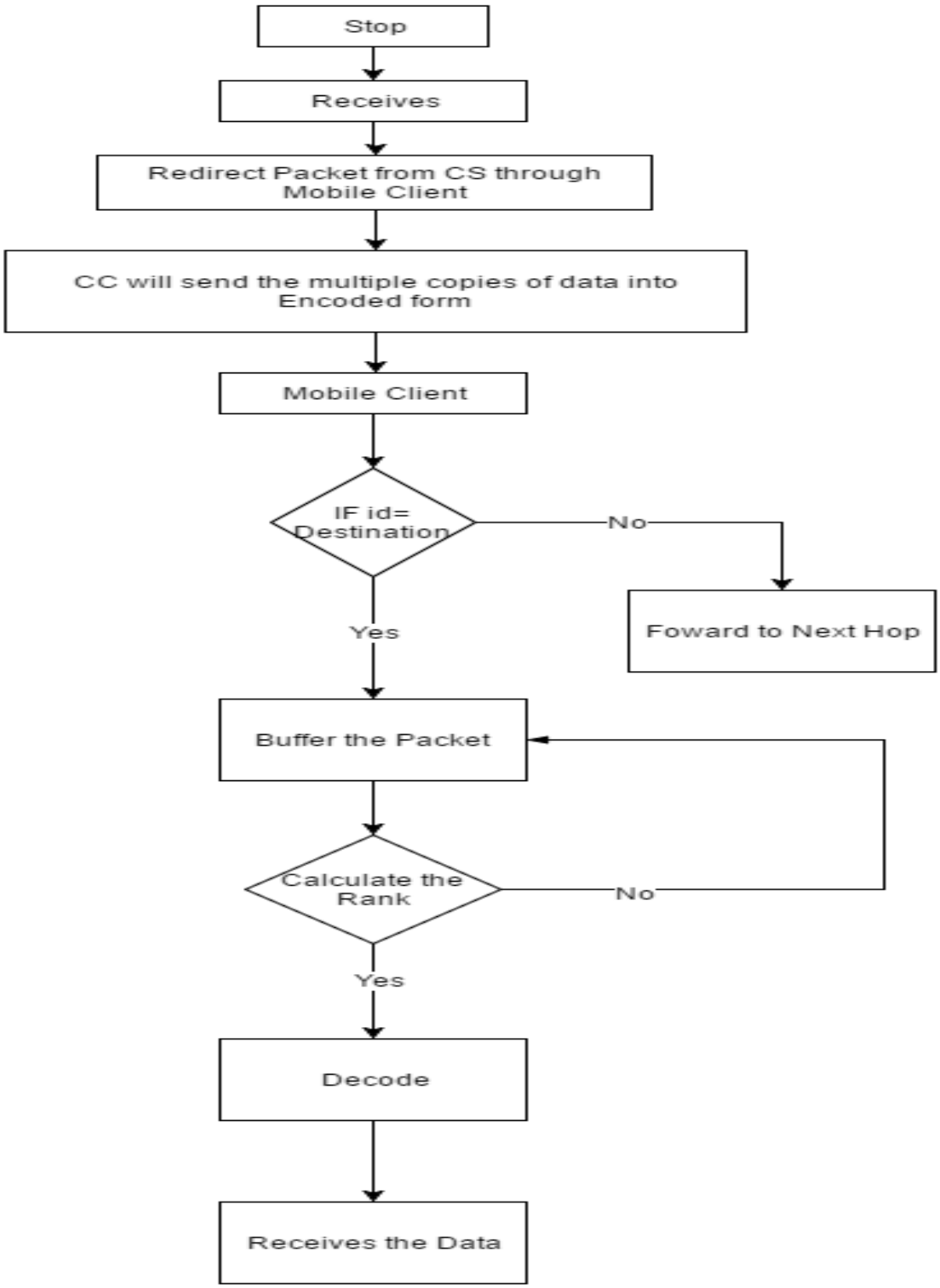


Figure 3: **Flowchart of data retrieving**

4. ENVIRONMENT SETUP AND IMPLEMENTATION

Figure 4. 4-bit packet encoding

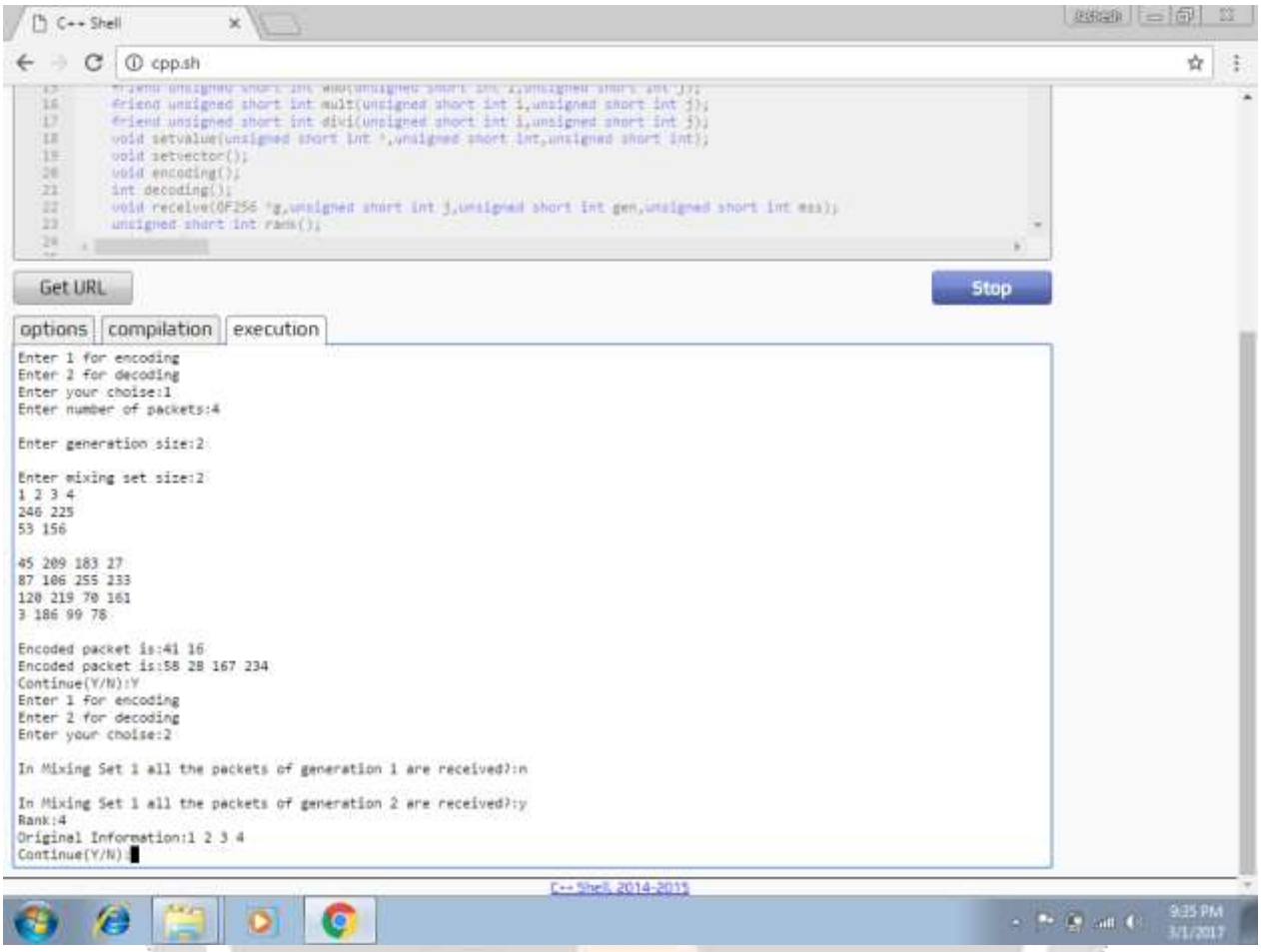
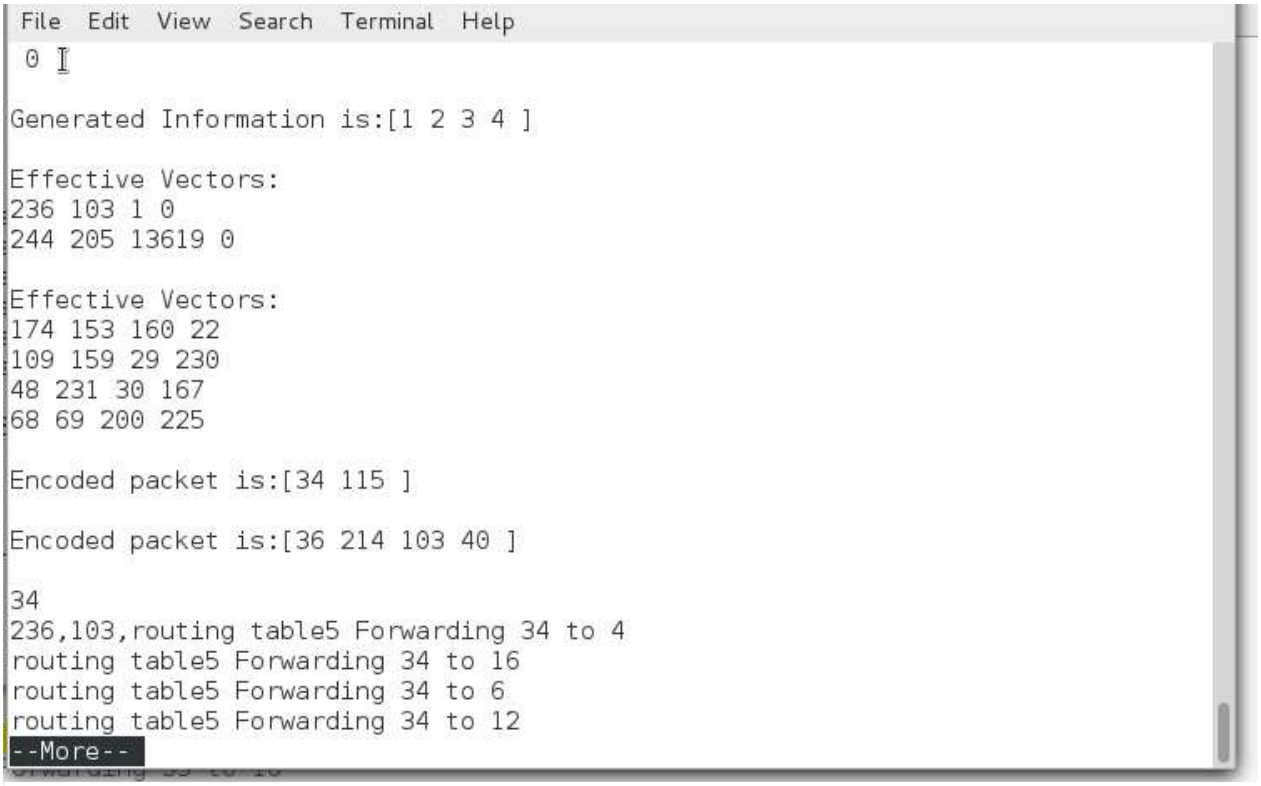
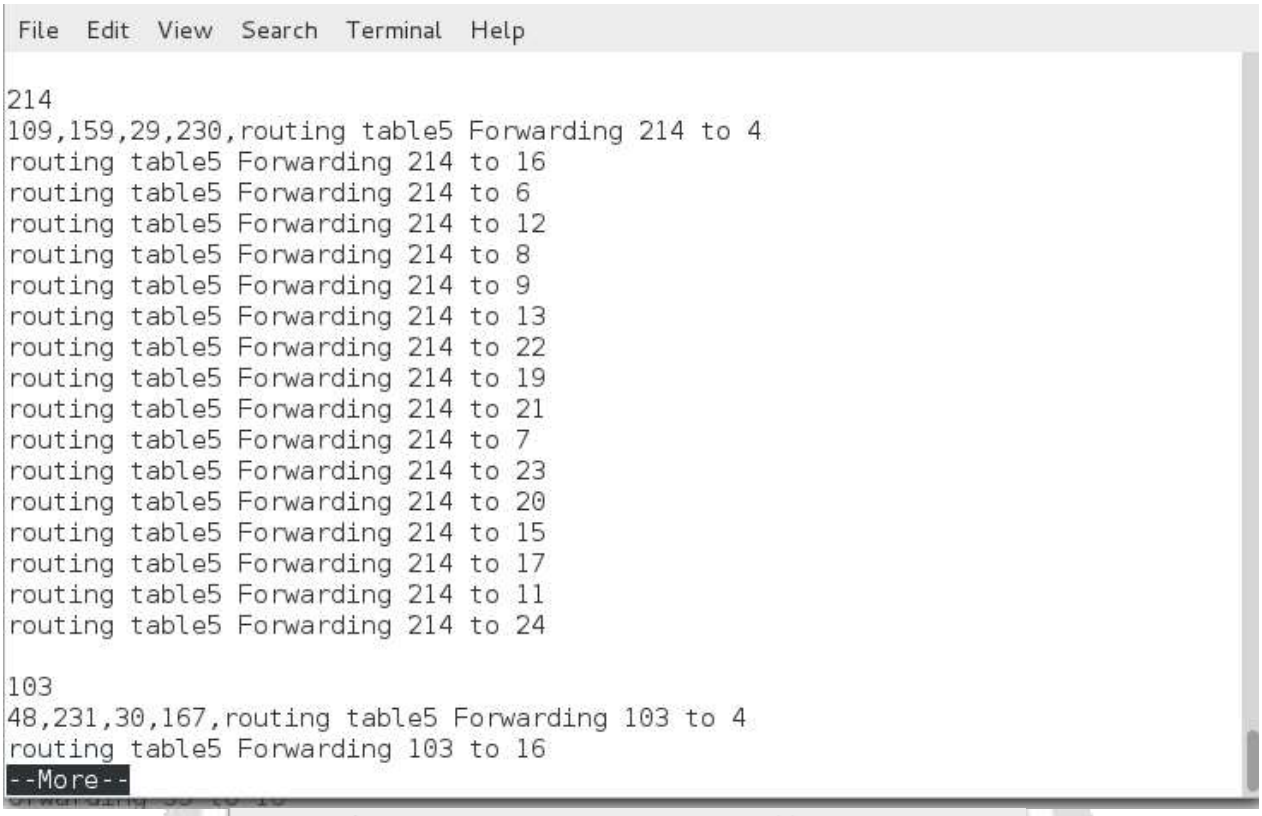


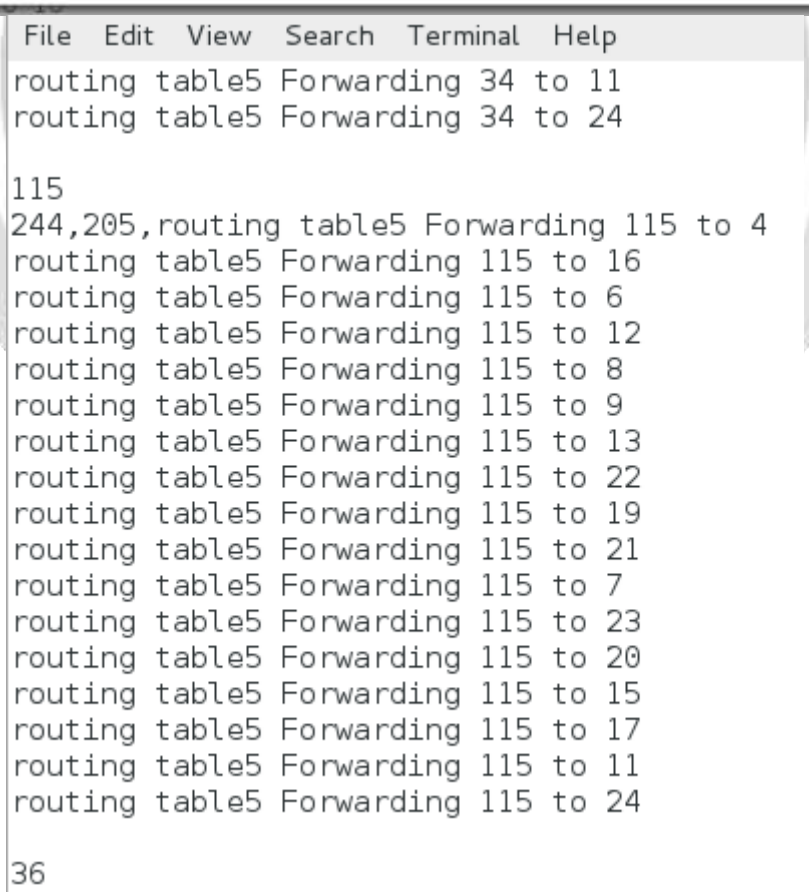
Figure 5. 4-bit packet decoding

Below screenshots show how the data is encoded and forwarded to the intermediate nodes. Then, the intermediate nodes will forward this data to the interface which then will direct this data to S3 storage.

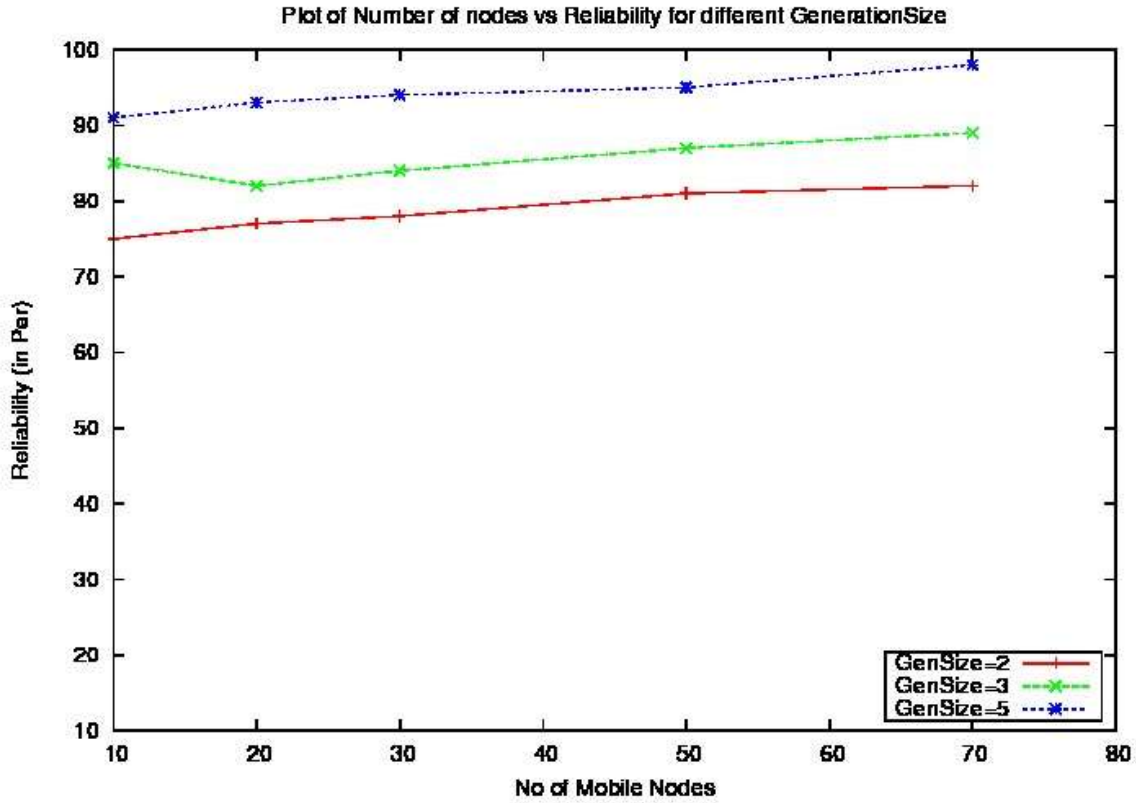


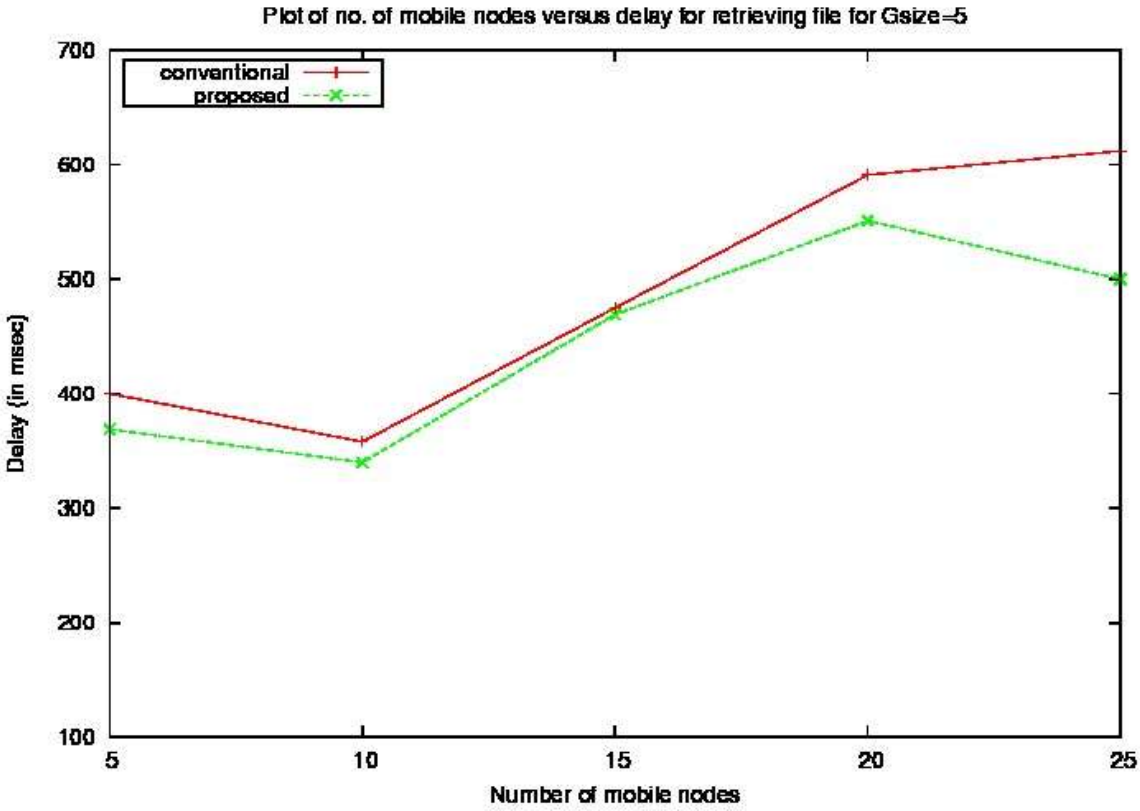

```
Original Information:[1 2 89 0 0 0 ]
R (540.005662): recv data 60 by 15 from 5 having mixing set id 0 and generation id 1
R (540.005662): recv data 60 by 17 from 5 having mixing set id 0 and generation id 1
R (540.005662): recv data 60 by 13 from 5 having mixing set id 0 and generation id 1
R (540.005662): recv data 60 by 11 from 5 having mixing set id 0 and generation id 1
R (540.006756): recv data 145 by 3 from 5 having mixing set id 0 and generation id 1
R (540.006756): recv data 145 by 7 from 5 having mixing set id 0 and generation id 1
R (540.006756): recv data 145 by 9 from 5 having mixing set id 0 and generation id 1
R (540.006756): recv data 145 by 19 from 5 having mixing set id 0 and generation id 1
R (540.006756): recv data 145 by 1 from 5 having mixing set id 0 and generation id 1
Received packet destined to me
```


File Edit View Search Terminal Help
214
109,159,29,230,routing table5 Forwarding 214 to 4
routing table5 Forwarding 214 to 16
routing table5 Forwarding 214 to 6
routing table5 Forwarding 214 to 12
routing table5 Forwarding 214 to 8
routing table5 Forwarding 214 to 9
routing table5 Forwarding 214 to 13
routing table5 Forwarding 214 to 22
routing table5 Forwarding 214 to 19
routing table5 Forwarding 214 to 21
routing table5 Forwarding 214 to 7
routing table5 Forwarding 214 to 23
routing table5 Forwarding 214 to 20
routing table5 Forwarding 214 to 15
routing table5 Forwarding 214 to 17
routing table5 Forwarding 214 to 11
routing table5 Forwarding 214 to 24
103
48,231,30,167,routing table5 Forwarding 103 to 4
routing table5 Forwarding 103 to 16
--More--


File Edit View Search Terminal Help
routing table5 Forwarding 34 to 11
routing table5 Forwarding 34 to 24
115
244,205,routing table5 Forwarding 115 to 4
routing table5 Forwarding 115 to 16
routing table5 Forwarding 115 to 6
routing table5 Forwarding 115 to 12
routing table5 Forwarding 115 to 8
routing table5 Forwarding 115 to 9
routing table5 Forwarding 115 to 13
routing table5 Forwarding 115 to 22
routing table5 Forwarding 115 to 19
routing table5 Forwarding 115 to 21
routing table5 Forwarding 115 to 7
routing table5 Forwarding 115 to 23
routing table5 Forwarding 115 to 20
routing table5 Forwarding 115 to 15
routing table5 Forwarding 115 to 17
routing table5 Forwarding 115 to 11
routing table5 Forwarding 115 to 24
36

5. PERFORMANCE EVALUATION





6. CONCLUSION AND FUTURE WORK

After the literature survey we proposed to develop Multi-Generation Mixing (MGM), which is a generalized approach for generation based network coding. With traditional generation based NC sender packets are grouped in generations where encoding and decoding are performed on packets that belong to the same generation. In scenarios i.e. wireless mobile clients, where losses cause insufficient reception of encoded packets, NC losses occur. NC losses are expensive; the minimum unit of loss is the loss of one generation. The proposed MGM framework allows the encoding among generations for the purpose of enhancing NC de-codability. With MGM in scenarios where insufficient number of encodings received of a generation, it is still possible to recover the generation using data encoded in other generations.

7. REFERENCES

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