An Efficient Framework for Provisioning Reliability in Cloud Using Network Coding

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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 our work, 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. 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 decoding. 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 DODEX and will demonstrate the improvements in performance achieved by MGM.

Keyword: - *Cloud Reliability, Multi-generation Mixing, DODEX, Data protection, Recovery, Cloud Storage*

1. INTRODUCTION

Cloud Computing provide the data is store in the cloud which is handle by cloud provider. cloud computing provide the services of Infrastructure as a Service, Platform as a Service and Software as a Service. If mobile cloud accessing the data in cloud provider no of mobile devices connected through wireless and mobile computing technologies .In this kind of networks users can interact with each other as well as take advantage of cloud computing services, storage and applications. The problem of efficiency disseminate and information and optimize the use of bandwidth in such networks is a recent big deal.[1] To deal with this problem various solutions are required. Network coding, Mesh network are used to this criteria. Mesh network provide the two tier topology. In a wireless mesh network, the first tier is composed of mesh routers which are fully connected together by wireless links. The Second tier includes the mesh clients who are connected the mesh routers in order to communicate between them. Mesh Network is easily establish in public transport systems, sport stadiums or emergency area. [5]

1.1 Network Coding

Network coding is a technique that is used to improve network's throughput, efficiency and scalability. It allows a network node to generate output messages by encoding its received messages to reduce the no of transmission so, its allows high bandwidth and minimum network consumption. Various types of network codlings available in network like Randomly linear network coding, sparse randomly linear network coding, Instantly Decodable Network Coding .In Randomly linear network coding matrix key is available which is easily decode the encoded packets. In sparse

randomly linear network coding the key is available in sparse matrix which is contain most of the zeros so that it is converted the encoded packet into decodable form with the help of sparse key. Instantly Decodable network coding use XOR to encode or decode the packet this advantage is must favorable in Bit by Bit Network Coding. Buffer is not require in this network coding

1.2 Network Coding with Multi-Generation Mixing

Network coding is used in byte to byte and bit to bit encoding and decoding .network coding contain independent linear combination packets if any receiver encoded packet is loss this loss are very expensive for this solution network coding with multi-generation mixing technique is introduced in this technique packet are encoded in the form of generation if one generation packet is fail to generate encoded packets second generation easily recover this packets fig 1 shows the data packets are encoded generation wise.fig 2 shows each generation is encoded with previously generation with mixing set so if one packet is loss other packet is easily available in generation wise mixing set

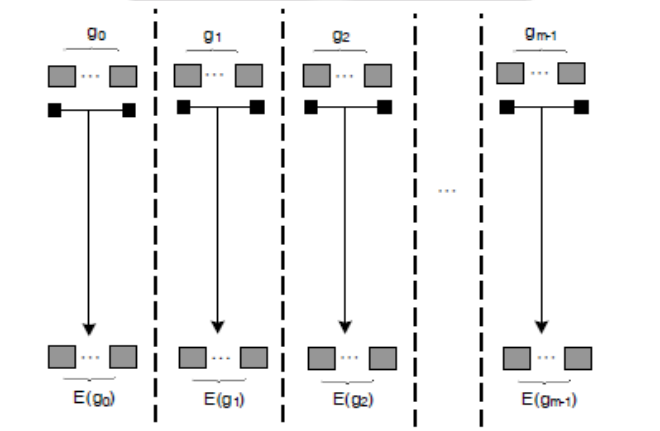

Fig -1 Generation based network coding each generation is encoded separately [2]

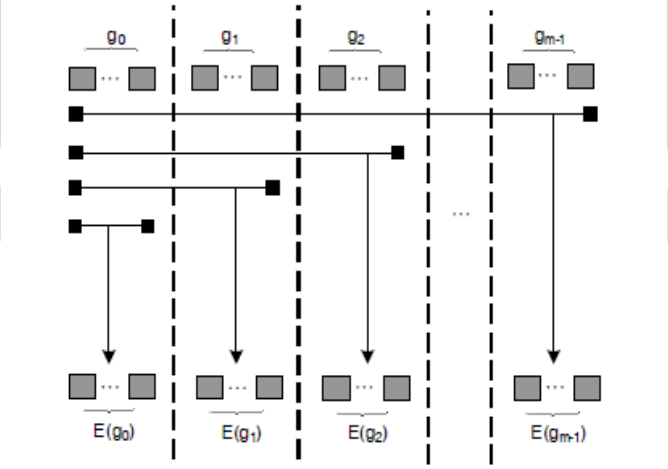

Fig -2MGM each generation is encoded with previous generation in mixing set [2]

2. RELATED WORK

2.1 Coding Opportunity (COPE)

Coding opportunity is used to broadcast all the combine data and transferring data very efficiently. In this figure B,D ,E broadcast packet p2,p3,p4 but in the A node broadcast all the packet of p1+p1+p3+p4 which is based on network coding.

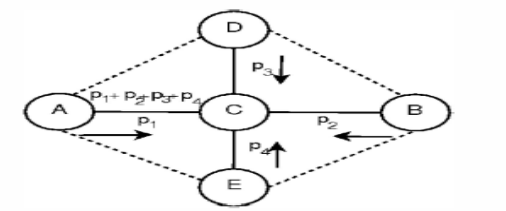

Fig -3 A coding scenario in COPE[5]

2.2 Distributed Coding Aware Routing (DCAR)

Distributed Coding Aware Routing is used to encode and decode the data.In this example 3 is the encoder and node 4 and 5 is decoder to encode and decode the data.

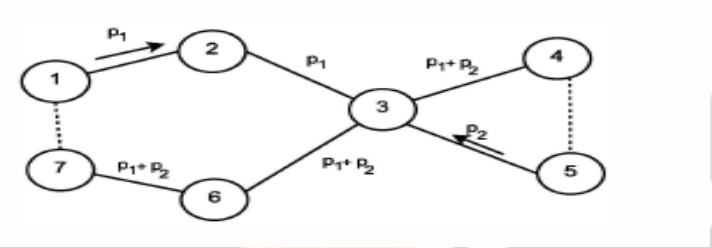

Fig -4 DCAR breaks on two hops coding pattern[5]

2.3 MAC-layer proactive mixing for network coding (BEND)

Distributed Coding Aware Routing is used to encode and MAC layer proactive mixing for network coding is used to combining two flow which is not intersect and complete the process of network encoding in this figure the floe 0-1-4 and flow 5-3-6 is combining by node 3

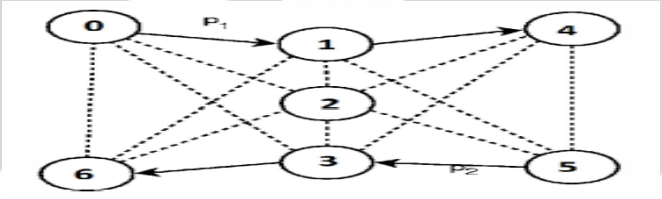

Fig -5 An encoder group in BEND[5]

2.4 Distributed and Diffused Encoding(DODE)

In DODE how the topology is choose to encode and decode the packet of data. Distributed In flow 1-2-3-5 anf flow 5-6-4 node 3 is act as a encoder and node 4 and 5 is act as a decoder.

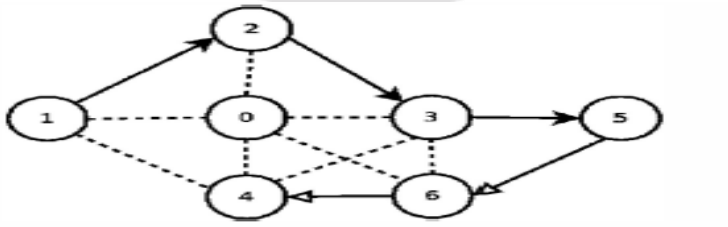

Fig -6 missing encoding chance scenario with COPE,BEND and DCAR[5]

2.5 Distributed and Diffused Encoding with multiple Decoders (DODEX)

Distributed and Diffused Encoding with multiple Decoders is used to decode the one by one packet each vector to know each other vector decode the packet very efficiently and forward the data into another packet. Consider the three flow 0-3-4-5,2-3-6,8-7-3-1 in flow 1 two decoders 4 and 5.node 4 is remove the p2 and 5 is remove the p3

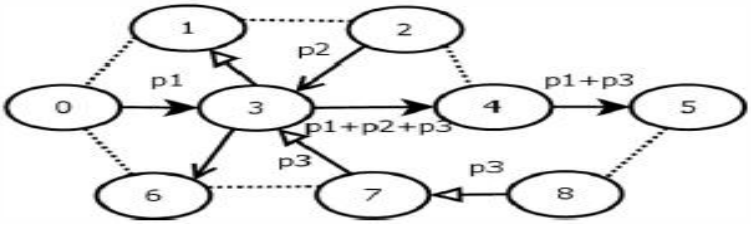

Fig -7 coding chance improve with DODEX [5]

2.6 Distributed and Diffused Encoding with multiple Encoders and multiple Decoders(DODEX+)

Distributed and Diffused Encoding with multiple encoders and multiple decoders is used to multiple encoders and multiple decoders with the help of multiple encoders it re-encoding the decoded data to provide the reliability in cloud in this figure node 2 generate p1+p1 to node 5 and node 6 generate the p3 in node 5 node 5 broadcast p1+p2+p3 in both side with network coding

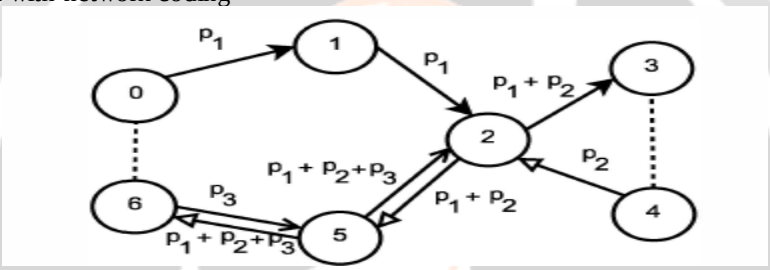

Fig -8 coding chance improve with DODEX+ [5]

3. PRPOSED WORK

Using of mesh network the data is forward to all mobile clients and data is store in cloud storage .data is access by any cloud with the help of Cloud controller but in this scenario to access and retrieve the data we use the distributed and diffused encoding (DODEX) which is forward the encoded packet of any client and using network coding with multi generation mixing technique to forward the packet to any client is encoded with generation wise if any generation is lost another generation easily recover the data which is provide high reliability in accessing and retrieving packet of any data.

4. RESULTS

The using of ns2 simulator we developed the technique to forward the packet using wireless flood routing protocol and multi-generation mixing logic is also build in this ns2 and configure the s3 with ns2 to store the data into the s3 and with the help of application program interface to retrieve the data in cloud The result of graph is shown in figure Coded with comparison of various methods 802.11,BEND,COPE,DCAR,DODEX,DODEX+,DODEX with MGM give maximum result for provide the reliability in cloud.

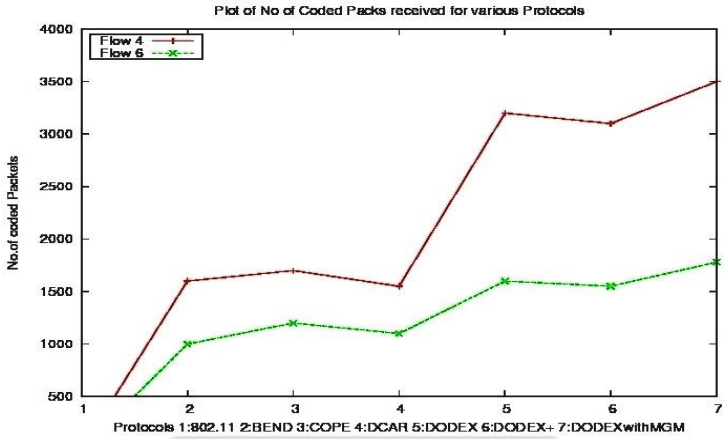

Chart -1: Coded packet scenario for protocols

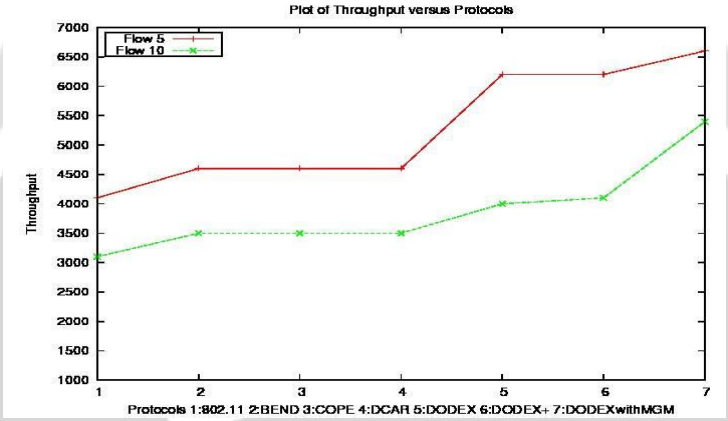

Chart -2: Throughput scenario for protocols

4. CONCLUSIONS

In cloud computing storage provides unlimited, flexible, scalable data are store. The data are not controlled by users but cloud provider when user of mobile cloud access this data various problems are occurred like bandwidth, data loss when using wireless access distance is so far. it is also hard to recover the data like encoding and decoding but using the network coding with multi-generation mixing technique provide the recover data very easily. It provides the high reliability in cloud.

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