**Report on Erasure Coding & Replication Based Schemes**

Both the techniques are efficient to build fault tolerant file system having distributed environment. Both scheme’s approach are totally. different. Replication will make replica of the file and will store on different file servers while erasure coding will encode the information in the file only and will use that information to decode the original file.

If replication scheme is used then data stored in the cluster will be too much, based on replication index. By default, replication index is set to 3, so nearly thrice the actual data size of file will be stored in cluster. In erasure coding, only 1.5 times of data size will be stored on cluster where 50% more data are generated using encoding schemes. Considering the storage utilization, erasure coding is doing good memory utilization.

Now, to get data stored on each chunk in replication scheme, there will be network IO consumed but it will be far less than erasure coding scheme. Reason behind that is, in replication, chunks will be stored in file servers ( 64KB in our example) while, in erasure, chunks will further be divided into shards and then different shards will be stored in each file server.

So instead of contacting one chunk server for one chunk, client has to contact one chunk server for each shard. (9 times in our example) Same concept will remain intact while retrieving data from cluster. So network IO utilization is not so well in erasure scheme.

Furthermore, in erasure schema client is responsible for merging and spiting of the file in both paradigm. As obviously, for dividing file in small shards and then creating encoded message and send it to different chunk server will consume so much CPU utilization too. For replication based, CPU overhead over client will be affordable. Answer to erasure’s drawback of CPU utilization will be, separate mechanism and latency reduction as, multiple servers are trying to access same block of the file. But in replication, to keep all replication consistence will introduce new overhead over main control server. To overcome size issue, compression algorithms can be used in replication. But use of compression and other schemas will introduce new concern – protective redundancy, Controller should make sure that, compression technique don't effect data integrity.

For my example, to store the file having 500 chunks of data, storing of data will take nearly 1-5 seconds in cluster having 6 live nodes while for same constraints it will take nearly 20 seconds to store content to cluster in erasure coding.

In the nutshell, erasure coding seems affordable if we want to trade of CPU utilization against storage utilization. Otherwise, if Storage is not bounded, replication can be a better choice.