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A Review on Energy-Efficient Fault-Tolerant Data Storage and Processing in Mobile Cloud

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Abstract - *Despite the advances in hardware for hand-held mobile devices, resource-intensive applications (e.g., video and image storage and process or map-reduce type) still stay off bounds since they need massive computation and storage capabilities. Recent analysis has tried to handle these problems by using remote servers, like clouds and peer mobile devices.For mobile devices deployed in dynamic networks (i.e., with frequent topology changes as a result of node failure/unavailability and mobility as during a mobile cloud), however, challenges of reliableness and energy potency stay for the most part unaddressed. To the simplest of our knowledge, we have a tendency to area unit the primary to handle these challenges in associate degree integrated manner for each knowledge storage and process in mobile cloud, associate degree approach we have a tendency to decision k-out-of-n computing. In our answer, mobile devices with success retrieve or method knowledge, within the most energy-efficient manner, as long as k out of n remote servers area unit accessible. Through a true system implementation we have a tendency to prove the practicability of our approach. in depth simulations demonstrate the fault tolerance and energy potency performance of our framework in larger scale networks.*

Key Words*: *k-out-of-n Data storage and processing, Energy efficiency, Fault Tolerance, Mobile cloud.

1.INTRODUCTION

PERSONAL mobile devices have gained huge quality in recent years. as a result of their restricted resources (e.g. computation, memory, energy), however, execution subtle applications (e.g., video and image storage and processing, or map-reduce type) on mobile devices remains challenging. As a result, several applications place confidence in offloading all or a part of their works to "remote servers" like clouds and peer mobile devices. for example, applications such as Google gape and Siri method the domestically collected data on clouds. Going on the far side the standard cloud-based scheme, recent analysis has projected to dump processes on mobile devices by migrating a Virtual Machine (VM) . This strategy essentially permits offloading any method or application, but it needs a sophisticated VM mechanism and a stable network connection. Some systems even leverage peer mobile devices as remote servers to complete computation-intensive job.

In dynamic networks, e.g., mobile cloud for disaster response or military operations, once choosing remote servers, energy consumption for accessing them must be reduced whereas taking under consideration the dynamically changing topology. fluke and different VMbased solutions thought of the energy value for process a task on mobile devices and offloading a task to the remote servers, however they didn't take into account the state of affairs in a multi-hop and dynamic network wherever the energy value for relaying transmitting packets is important. what is more, remote servers area unit typically inaccessible attributable to node failures, unstable links, or node-mobility, raising a reliability issue. though fluke considers intermittent connections, node failures aren't taken into account; the VM-based answer considers solely static networks and is troublesome to deploy in dynamic environments.

2. ENERGY EFFICIENT AND FAULT TOLERANT DATA ALLOCATION AND PROCESSING

More specifically, we have a tendency to investigate the way to store information as well as method the hold on information in mobile cloud with k-out of-n responsibleness such that: 1) the energy consumption for retrieving distributed information is minimized; 2) the energy consumption for process the distributed information is minimized; and 3) information and process square measure distributed considering dynamic topology changes. In our planned framework, a data object is encoded and partitioned off into n fragments, and then hold on on n completely different nodes. As long as k or a lot of of the n nodes square measure offered, the info object may be with success recovered. Similarly, another set of n nodes square measure assigned tasks for process the hold on information and every one tasks may be completed as long as k or a lot of of the n process nodes end the assigned tasks. The parameters k and n confirm the degree of responsibleness and completely different ðk; nÞ pairs is also assigned to information storage and processing. System directors select these parameters supported their responsibleness requirements. The contributions of this paper square measure as follows

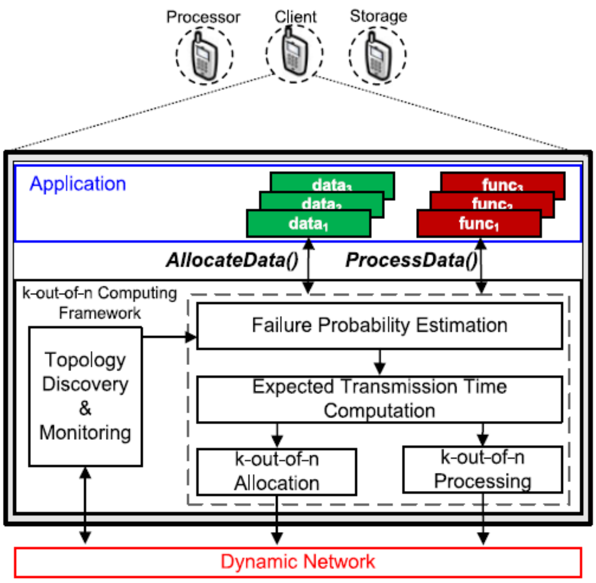

Fig -1: Architecture for integrating the k-out-of-n computing framework for energy efficiency and fault-tolerance. The framework is running on all
nodes and it provides data storage and data processing services to applications, e.g., image processing, Hadoop[22].

3. LITERATURE SURVEY

Many works about energy efficiency and fault tolerance have been investigated. In paper [11] Dimakis provided an overview of recent results about the problem of reducing repair traffic in distributed storage systems based on erasure coding. Three versions of the repair problems are considered: exact repair, functional repair and exact repair of systematic parts .Several erasure coding algorithms for maintaining a distributed storage system in a dynamic network.In paper [12]

Leong proposed an algorithm for optimal data allocation that maximizes the recovery probability and hence Provides reliability.In paper [13] Aguilera proposed a protocol to efficiently adopt erasure code which provides better reliability .But these solutions, focuses only on system reliability and energy efficiency is not considered

TABLE 1. PREVIOUS WORK

PREVIOUS RESEARCH PAPERS	RESULT/CONCLUSION
Alicherry, Lakshman	Worked on two-approx algorithm for selecting optimal data centers determines latency and communication cost
Beloglazov	Used Modified Best Fit Decreasing algorithm for latency and communication cost
Liu	Proposed an Energy-Efficient Scheduling (DEES) algorithm that saves energy by integrating the process of scheduling tasks and data placement
Shires	Proposed cloudlet seeding, a strategic placement of high performance computing assets in wireless ad-hoc network such that computational load is balanced

3. PROPOSED WORK

From the above discussed survey we choose the effective way of k-out-of-n computing terminology for which we can proceed for energy consumption and fault tolerance that assigns data fragments to nodes such that other nodes retrieve data reliably.Some of the main challenges of mobile devices is energy consumption that is utilized by the media content but using the cloud involves data reliability, network availability, load imbalance and data latency/synchronization in case of multiple media streams from different clouds. The ultimate aim is to enable a systematic approach to improving power management of mobile devices.

A.Nework Topology

Geology Determination is executed during the network initialization phase or whenever a significant change of the network geologyis detected (as detected by theTopology Monitoring component). During Geology Determination, one delegated node floods a request packet throughout the network.Upon receiving the request packet, nodes reply with their neighbor tables and failure probabilities. Consequently, the delegated node obtains global connectivity information and failure probabilities of all nodes. This topology information can later be queried by any node.

B. Failure Probability Estimation

We assume a fault model in which faults caused only by node failures and a node is inaccessible and cannot provide any service once it fails. The failure probability of a node estimated at time t is the probability that the node fails by time t þ T, where T is a time interval during which the estimated failure probability is effective. A node estimates its failure probability based on the following events/causes: energy depletion, temporary disconnection from a network (e.g., due to mobility), and application specific factors. We assume that these events happen independently. Let f be the event that node i fails and let f Bi;f Ci; and f be the events that node i fails due to energy depletion, temporary disconnection from a network, and application-specific factors respectively.

C. Expected Transmission Time Estimation

It is known that a path with minimal hop count does not necessarily have minimal end-to-end delay because a path with lower hop-count may have noisy links, resulting in higher end-to-end delay. Longer delay implies higher transmission energy. As a result, when distributing data or processing the distributed data, we consider the most energy efficient paths—paths with minimal transmission time. When we say path p is the shortest path from node i to node j, we imply that path p has the lowest transmission time (equivalently, lowest energy consumption) for transmitting a packet from node i to node j. The shortest distance then implies the lowest transmission time.

3. CONCLUSIONS

In the proposed system, the problems in limited resource of mobile devices and how to execute sophisticated application on mobile devices are studied. The k-out-of-n computing is used for energy consumption assigned data fragments to nodes that leads for energy consumption in storing reliable data and retrieving the data reliably. This survey has provided us a crystal clear idea about the wide dimensions of energy consumption for retrieving and processing the distributed data and to support the fault-tolerant under the dynamic network topology.It investigate how to store data as well as process the stored data in mobile cloud with k-out of-n reliability such that: 1) The energy consumption for retrieving distributed data is minimized; 2) The energy consumption for processing the distributed data is minimized and 3) Data and processing are distributed considering dynamic topology changes

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