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Enhanced LDDOS Aware Multipath Scheme using EE-SR Routing Protocol Model

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ABSTRACT- **The multi-homed mobile devices in the mobile cloud computing (MCC) systems can improve their throughput by allocating the application data over several paths simultaneously, enabled by the promising Multipath TCP (MPTCP) technology. Meanwhile, network attacks against current Internet infrastructures are likely to increase, especially with the widely deployment of MCC systems. When a MPTCP connection is under network attacks and becomes a poor-performing path or a broken path, it can significantly affect other stable paths and in the absence of related schemes to handle this, MPTCP will undoubtedly suffer from serious performance degradation. Moreover, applying MPTCP to cloud data delivery may generally lead to higher energy consumption and is not favorable to a power-constrained mobile device.**

The proposed MPTCP-La/E2 has been evaluated with a wide range of performance metrics. The simulation results demonstrate how MPTCP-La/E2 outperforms the baseline MPTCP in terms of QoS and energy-savings. In this proposed system applying MPTCP to a MCC mobile device raises a new concern, namely, the high energy consumption for concurrent use of multiple network interfaces. In addition to muting the potentially broken network interfaces for application data delivery and energy saving using QOD Routing protocol model.

Key words: MPTCP,MCC,LDDOs

I.INTRODUCTION

In this project, to provide an extensive model of mobile cloud computing research, while highlighting the specific concerns in mobile cloud computing. The present taxonomy based on the key issues in this area, and discusses the different approaches taken to tackle these issues. To conclude the paper with a critical analysis and challenges that have not yet been fully met, and highlight directions for future work.The increasing usage of mobile computing is evident by the study by Juniper Research, which states that the consumer and enterprise market for cloud-based mobile applications. In present, applications targeted at mobile devices have started becoming abundant with applications in various categories such as entertainment, health, games, business, social networking, travel and news.

The reason for this is that mobile computing is able to provide a tool to the user when and where it is needed irrespective of user movement, hence supporting location independence. Indeed, ‘mobility’ is one of the characteristics of a pervasive computing environment where the user is able to continue his/her work seamlessly regardless of his/her movement.

However, with mobility come its inherent problems such as resource scarceness, finite energy and low connectivity as outlined. These pose the problem of executing many useful programs that could aid the user and create a pervasive environment. According to Tim O’Reilly ‘the future belongs to services that respond in real time to information provided either by their users or by nonhuman sensors .Real time applications are just one type of mobile applications that demand high levels of responsiveness, that in turn, demand intensive computing resources.

The case for mobile cloud computing can be argued by considering the unique advantages of empowered mobile computing, and a wide range of potential mobile cloud applications have been recognized in the literature. These applications fall into different areas such as image processing, natural language processing, sharing GPS, sharing Internet access, sensor data applications, querying, crowd computing and multimedia search.

However, as explained , applications that involve distributed computation do have certain common characteristics, such as having data with easily detectable segment boundaries, and the time to recombine partial results into a complete result must also be small. An example is string matching/manipulation such as grep and word frequency counters. The different applications and scenarios presented in recent literatures.

II.RELATED WORKS

Despite increasing usage of mobile computing, exploiting its full potential is difficult due to its inherentproblems such as resource scarcity, frequent disconnections, and mobility. Mobile cloud computingcan address these problems by executing mobile applications on resource providers external to themobile device. In this paper, we provide an extensive survey of mobile cloud computing research, whilehighlighting the specific concerns in mobile cloud computing. We present a taxonomy based on the keyissues in this area, and discuss the different approaches taken to tackle these issues. We conclude thepaper with a critical analysis of challenges that have not yet been fully met, and highlight directions for future work.

Cloud computing is an emerging concept combining many fields of computing. The foundation of cloud computing is the delivery of services, software and processing capacity over the Internet, reducing cost, increasing storage, automating systems, decoupling of service delivery from underlying technology, and providing flexibility and mobility of information. However, the actual realization of these benefits is far from being achieved for mobile applications and open many new research questions. In order to better understand how to facilitate the building of mobile cloud-based applications, we have surveyed existing work in mobile computing through the prism of cloud computing principles. We give a definition of mobile cloud coputing and provide an overview of the results from this review, in particular, models of mobile cloud applications. We also highlight research challenges in the area of mobile cloud computing. We conclude with recommendations for how this better understanding of mobile cloud computing can help building more powerful mobile applications.

Our strategy of leveraging transiently cus- tomized proximate infrastructure as a mobile device moves with its user through the physical world is called cloudlet-based, resource-rich, mobile computing. Crisp interactive response, which is essential for seamless augmentation of human cognition, is easily achieved in this architecture because of the cloudlet’s physical proximity and one-hop network latency. Using a cloudlet also simplifies the challenge of meet- ing the peak bandwidth demand of multiple us- ers interactively generating and receiving media such as high-definition video and high-resolu- tion images. Rapid customization of infrastruc- ture for diverse applications emerges as a critical requirement, and our results from a proof-of-concept prototype suggest that VM technology can indeed help meet this requirement.

Byung-Gon Chun, Sunghwan Ihm, Petros Maniatis et al describe a mobile applications are becoming increasingly ubiquitous and provide ever richer functionality on mobile devices. At the same time, such devices often enjoy strong connectivity with more powerful machines ranging from laptops and desktops to commercial clouds. This paper presents the design and implementation of Clone Cloud, a system that automatically transforms mobile applications to benefit from the cloud. The system is a flexible application partitioned and execution runtime that enables unmodified mobile applications running in an application-level virtual machine to seamlessly off-load part of their execution from mobile devices onto device clones operating in a computational cloud.

Clone Cloud uses a combination of static analysis and dynamic profiling to partition applications automatically at a fine granularity while optimizing execution time and energy use for a target computation and communication environment. At runtime, the application partitioning is effected by migrating a thread from the mobile device at a chosen point to the clone in the cloud, executing there for the remainder of the partition, and re-integrating the migrated thread back to the mobile device. Their evaluation shows that Clone Cloud can adapt application partitioning to different environments, and can help some applications achieve as much as a 20x execution speed- up and a 20-fold decrease of energy spent on the mobile device.

III SYSTEM METHODOLOGY

In this project impact of LDDoS services on the performance of MPTCP, a basic dual-dumbbell simulation topology with reasonable LDDoS attack traffic model. In the topology, the MPTCP sender and receiver connect to the MCC network through two network interfaces. Each router on multipath is attached with edge nodes. These edge nodes are equipped with a single network interface and connect to the routes to generate the LDDoS traffic model. The main problem of the QOS routing protocol is attempts to directly adapt the QoS solutions for infrastructure networks to Mobile Cloud Computing generally do not have great success. Numerous reservation-based QoS routing protocols have been proposed for Mobile Cloud Computing that create routes formed by nodes and links that reserve their resources to fulfill QoS requirements.

Although these protocols can increase the QoS of the Mobile cloud computing to a certain extent, they suffer from invalid reservation and race condition problems. Invalid reservation problem means that the reserved resources become useless if the data transmission path between a source node and a destination node breaks. Due this problem the qualified neighbor nodes identification is tough in worst case scenario (where number of nodes is very large). To overcome the problem, an application is required and it should be capable of implementing the neighbor nodes identification efficiently. On this basis, a slicing based approach is selected to filter the neighbor nodes through which the next hop transmission occurs. And also the unnecessary transmission is avoided.

Motivated by the facts that a poor-performing path caused by LDDoS attacks can present a significant impact on MPTCP's performance and quality of service, this paper proposes a novel LDDoS attack-aware energy-efficient MPTCP solution dubbed as MPTCP-La/E2 for multi-homed MCC systems. MPTCP-La/E2 mainly consists of two components, which are LDDoS-aware multipath manager (LaM2) that is devoted to detecting the transmission quality of each MPTCP
path, switching a path to a proper state, and choosing a subset of suitable paths for multi pathing, and energy-efficient data scheduler (E2DS) that is devoted to achieving bandwidth aggregation and energy-savings by jointly considering the transmission state and energy cost of each path communication.

The QoS support reduces end- o-end transmission delay and enhances throughput to guarantee the seamless communication between mobile devices and wireless infrastructures. At the same time, hybrid mobile cloud networks (i.e., multi- hop cellular networks) have been proven to be a better network structure for the next generation mobile cloud networks and can help to tackle the stringent end-to- end QoS requirements of different applications. Hybrid networks synergistically combine infrastructure networks and mobile cloud computing to leverage each other. Specifically, infra-structure networks improve the scalability of mobile cloud computing, while mobile cloud computing automatically establishes self-organizing networks, extending the coverage of the infrastructure networks. Direct adoption of the QoS routing techniques in mobile cloud computing into hybrid networks inherits their drawbacks. In this project, a QoS-oriented distributed routing protocol (QOD) for hybrid networks to provide QoS services in a highly dynamic scenario. Taking advantage of the unique features of hybrid mobile cloud networks, i.e., anycast transmission and short transmission hops, QOD transforms the packet routing problem to a packet scheduling problem.

In QOD, a source node directly transmits packets to an AP if the direct transmission can guarantee the QoS of the traffic. Otherwise, the source node schedules the packets to a number of qualified neighbor nodes. Specifically, QOD incorporates five algorithms. The QoS-guaranteed neighbor selection algorithm chooses qualified neighbors for packet forwarding. The distributed packet scheduling algorithm schedules the packet transmission to further reduce the packet transmission time.

A. SERVER MODULE

In this module, packet type addition, router metric information such as packet type, incoming bit rate, max packet time to live, packet resend times. The incoming packet receiving, sending out normally or adding in queue, dropping from queue or normal sent out are calculated and continuous packet drop is found and alerted to high speed applications to reduce the packet sending speed.

B. CLIENT APPLICATION

In this module, the IP address of the running node is found out and used through out the coding. The packets are generated and sent out so that the information is stored in a table directly from that node. A new record is 'Packets In' table is added during application load and packet count is updated each time the packets are sent. A record is inserted in 'Log' table with status 'On' and 'Off' during load and unload.

C. CLIENT APPLICATION FOR HIGH SPEED NODES

In this module, the IP address of the running node is found out and used through out the coding. The packets are generated and sent out so that the information is stored in a table with Port Type field set to 'S' directly from that node. A new record is 'PacketsIn' table is added during application load and packet count is updated each time the packets are sent. A record is inserted in 'Log' table with status 'On' and 'Off' during load and unload.

D. ADD ACCESS POINT

In this module, the access point node id, name, IP address details are added and saved in 'AP' table.

E. ADD MOBILE NODES

In this module, the mobile node id, name, IP address and the initial location details are added and saved in 'Nodes' table.

F. ASSIGN ACCESS POINT/MOBILE NODES

In this module, the mobile node is assigned with its nearest access point. The details are fetched from 'AP' and 'Nodes' table and saved in 'APNodes' table.

G. QOS-ORIENTED DISTRIBUTED ROUTING PROTOCOL (QOD)

This module enhances the QoS support capability of hybrid networks. Taking advantage of fewer transmission hops and anycast transmission features of the hybrid networks, QOD transforms the packet routing problem to a resource scheduling problem. QOD incorporates five algorithms:

QoS-guaranteed neighbor selection algorithm to meet the transmission delay requirement

Distributed packet scheduling algorithm to further reduce transmission delay,

Mobility-based segment resizing algorithm that adaptively adjusts segment size according to node mobility in order to reduce transmission time.

Traffic redundant elimination algorithm to increase the transmission throughput.Pseudo code for the QOD routing protocol executed by a source node.

if receive a packet forwarding request from a source node then
f this. SpaceUtility < threshold then
Reply to the source node.
end if
end if
if receive forwarding request replies for neighbor nodes then
Determine the packet size Sp(i) to each neighbor I based on Equation .
Estimate the queuing delay Tw for the packet for each neighbor based on Equation .
Determine the qualified neighbors that can satisfy the deadline requirements based on Tw
Sort the qualified nodes in descending order of Tw
Allocate workload rate Ai for each node based on Equation .
for each intermediate node ni in the sorted list do
Send packets to ni with transmission interval Sp(i)/ Ai.
end for
end if

H. IMPLEMENTATION OF PROPOSED SLICE-BASED SELECTION ALGORITHM

This module shows the proposed slice-based selection algorithm. Suppose that node N_A uses the proposed algorithm to select the forwarding nodes from its neighbors. Let us assume that N_A stores all of its neighbors' IDs and locations in an array of length n, where n is the number of neighbors. The algorithm selects the first node N_{S1} randomly from the array. The first node can also be selected deterministically by, for example, selecting the node that is the farthest away from N_A. Let $LB_A(P)$ and $RB_A(P)$ denote the left bulged slice and right bulged slice of P around A respectively. Suppose that N_{Si} is the last node selected by the algorithm. To select the next node, the algorithm iterates through the array and selects the node $N_{Si+1.}$.

V.CONCLUSION

In this project propose a novel LDDoS attack-aware energy-efficient MPTCP solution (dubbed as MPTCP-La/E2) for multi-homed MCC systems in order to address the issues of LDDoS attacks and mobile energy consumption. The goals of MPTCP-La/E2 are: (i) to avoid the performance degradation of cloud multipath transmission caused by LDDoS attacks, and (ii) to optimize the energy usage while still maintaining user's perceived quality of cloud multipathing services.

In addition the project makes five contributions. QoS-guaranteed neighbor selection algorithm. The algorithm selects qualified neighbors and employs deadline-driven scheduling mechanism to guarantee QoS routing- Distributed packet scheduling algorithm. After qualified neighbors are identified, this algorithm schedules packet routing. It assigns earlier generated packets to forward with higher queuing delays, while assigns more recently generated packets to forward with lower queuing delays to reduce total transmission delay.

Mobility-based segment resizing algorithm is a source node adaptively resizes each packet in its packet stream for each neighbor node according to the neighbor's mobility in order to increase the scheduling feasibility of the packets from the source node. Soft-deadline based forwarding scheduling algorithm. In this algorithm, an intermediate node first forwards the packet with the least time allowed to wait before being forwarded out to achieve fairness in packet forwarding. Data redundancy elimination based transmission.

Due to the broadcasting feature of the wireless networks, the APs and mobile nodes can overhear and cache packets. This algorithm eliminates the redundant data to improve the QoS of the packet transmission.

VI. SCOPE FOR FUTURE ENHANCEMENT

In the future, we will study how to utilize the inferred information and extend the framework for efficient and effective broadcasting mechanism. There are still many interesting issues not yet examined in our study such as searching for routing path mobile neighbor node, improve quality routing paths, and develop non overlapping routing process. We leave these changes for future research. The new system become useful if the below enhancements are made in future.

- The application can be web service oriented so that it can be further developed in any platform.
- The application if developed as web site can be used from anywhere.
- The algorithm can be further improved so that nodes count is reduced for broadcasting in the worst case.

The new system is designed such that those enhancements can be integrated with current modules easily with less integration work.

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