Image Transmission Mechanism For Android Platform In 4G

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Keywords: Image Transmission; Android Platform; multimedia transmission

Abstract. Aiming at the problems in service oriented real-time multimedia transmission, such as a long delay, frequent jitter and low reliability, this paper proposes LD-RPath algorithm LD/RPath estimates the dynamic data volume on service nodes and links through reasonable data volume approximation. And the data splitting technique is imported to convert the node delay into the edge delay. In the mean time, the reliability of nodes is considered as a coefficient of delay, so that the multimedia delivery problem is transformed into a conventional shortest path problem. The advantages of this algorithm are as follows. 1) The reliability is integrated into the edge weights reasonably, which guarantee the reliability in the choice of the shortest path. 2) The reasonable approximate of data reduces the problem's complexity. 3) Node split integrates node weights into edge weights.

Introduction

Real-time multimedia transmission system is widely used in real-time monitoring system, video conferencing and the others [1]. However, with the development of the mobile devices' ability and wireless communication technology, the traditional single network environment gradually becomes heterogeneous equipment and pervasive computing environment made up of network. Multimedia transmission has obvious differences with traditional file transmission, the transmission of traditional file for transmission delay, jitter is not too many requirements, but there are strict error control and retransmission mechanism. In the transmission of real-time multimedia transmission, demanding synchronicity, and requires small transmission delay. Multimedia transmission can endure packet loss caused by the error and abnormal, can endure due to no retransmission or error correction mechanism of packet loss or latency, but it will not tolerate caused by error control mechanism based on retransmission display discontinuity or confusion. In the pervasive environment, the difference of different links' transmission capacity is huge, and in particular, wireless link bandwidth is smaller and unstable; the difference of each node's processing capacity is huge, and in particular, the mobile node's processing power is often weak [2-4]. These features can not ensure the reliability of real-time multimedia transmission system.

Multimedia network transmission technology, however, because of the multimedia compression, compression and transmission problem not solve, have not been able to achieve the ideal effect. In recent years, multimedia communication technology,SOA uses the available service to build loose coupling application. As the key technology of SOA, service composition can combine independently distributed and available basic service to meet user's complex business requirements, which makes it adapt to the pervasive computing environment [5]. These characteristics help SOA use the existing distributed service resources to dynamically build loose coupling multimedia transmission system in pervasive environment.

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Proposed Method

Some multimedia services will change the amount of data, so before the path was not determined, we cannot know a service node or link on the actual amount of data transmission. In Figure 2, a S0 data is m, so before the path is not determined, processing data may be from s_0 and $s_1^1(or\, s_1^2)$ transmission reaches, there may be from s_0 $s_1^1(or\, s_1^2)$ reach and s_2 transmission. Therefore, the data may be $m.r_0.r_1$ m ·r0· r1. Th needed to approximate amount of data processing.

As the algorithm shown in algorithm 1 data approximation, the main idea is that, for a service replica node s_i, assuming the L precursor node in the service map, and then we considered the amount of data received by the s_i data volume is equal to the all L precursor node output of the arithmetic average. Note that these precursor nodes associated with the amount of data is similar, so this is a recursive process.

Algorithm1. Approximation algorithm for data

a) $Initialization: index[i] \leftarrow 0$ {Initialize each service node number is 0}

b) $flag \leftarrow true$

c) $while\ flag = true\ do$ {As long as the node number changed, the serial number will continue to adjust}

d) $flag \leftarrow false$

e) $for\ each\ e(i, j) \in E\ do$

f) $if\ index(j) \le index(i) then$ {Ensure to number tail node side than the first node number}

g) $index(i) \leftarrow index(j) + 2$ {Node number adjustment}

h) $flag \leftarrow true$

i) $end\ if$

j) $end\ for$

k) $end\ while$

l) $for\ each\ index[i]\ do$

m) $t \leftarrow 0, sum \leftarrow 0$

n) $for\ each\ node\ v \in ty\ do$ {Find all the precursor nodes}

o) $if\ v\ has\ a\ service\ link\ to\ index[i] then$

p) $t \leftarrow t+1, sum \leftarrow sum + m[v]$ {The amount of data accumulated from all of its precursor, and count}

r) $end\ if$

s) $end\ for$

t) $m[index[i]] = sum / t$ {The amount of data the precursor node all outgoing arithmetic average }

u) $end\ for$

v) $return\ m[O, S_{n-1}]$

To solve the shortest path algorithm is the single source weights at the edge of the shortest path problem, but our service on the node graph have cost (weight), so we need to make some transformation of service graph, which can be used the shortest path algorithm.

Choi et al proposed method of node splitting to translate some network problems. This method is used. For example, in figure 2, we will s_2 split into two nodes $s_{2,1}$ and $s_{2,2}$, then let all the precursor node s_2 are connected to the $s_{2,1}$, $s_{2,2}$ connected to all nodes of S2. Data processing delay raw to s_2 node above, now use between $s_{2,1}$ and $s_{2,2}$ the cost of edge to said, it is called such as between $s_{2,1}$ and $s_{2,2}$ for the internal side edge (inner- link). Our service in every node splitting process, adding a new node, eliminating the vertices above cost, the price converted services diagram exists only on the edge.

Due to the dynamic and mobility in pervasive environment, service replica node may fail. System requirements are to find a delay as small as possible, path of service and reliability as high as possible. The idea is to make the reliability of the parameters, the processing delay of the node.

The previous QoS related research work, a coefficient for each service internal edges in graph, the coefficient of reliability service node is an internal edge represents the inverse of E. After this treatment, the service replica node distribution coefficient of higher reliability coefficient is relatively small, low reliability of service replica node distribution the relatively large. These internal edge new delay cost is the original price multiplied by the respective coefficient, as processing delay internal edge new.

This process idea is straightforward: for the single source shortest path algorithm for the shortest path, a service copy reliability makes the low reliability of the inner side of the price is relatively high, the higher reliability of service copy internal edge cost becomes lower, and the shortest path algorithm to select the the shortest path selection bias in service copy the higher reliability. That is to say, the service replica node reliability higher more easily by the algorithm. The LD/Rpath algorithm of time delay is small selected path, at the same time, high reliability, to achieve a balance between the two.

Results of Analysis

The running time of 3 algorithms were compared in the topology of the network scale under different operation respectively. 3 kinds of algorithm 100 times, and then take the average execution time of 100 runs for comparison, as shown in Figure 1. We can see, the running time of LD/RPath algorithm and Random algorithm are much less than the optimal algorithm. When the network size is large, the running time of LD/RPath algorithm and Random algorithm are almost the same, therefore, the higher the efficiency of LD/RPath algorithm. In addition to the data shown in Fig., we also compared the running time of each algorithm is more large-scale network topology, node number reached 70, Optimal algorithm execution time was more than 80s. in a real-time multimedia transmission system, 80s delay is clearly not acceptable. So in the following experiments, when the number of nodes exceeds 70, we no longer consider optimal algorithm.

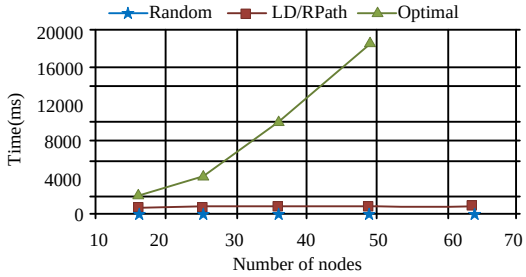

Figure1. The effect of 3 kinds of algorithms are compared in different network size

Then, the effect of 3 kinds of algorithms are compared in different network size. The experimental data shown in Figure 2 is the MaxService=7, MinInstance=2, MaxInstance=7 configuration. Under this configuration, we run 50 experiments in each experiment, the topological structure of network is to randomly generated, each experiment included 1 times 1 times LD/RPath algorithm, Optimal algorithm and Random algorithm 20 times, the results of the Random algorithm, the best results in 20 , time delay, reliability and delay / reliable ratio as shown in Figure 5.

Figure 2 (a) that is the 50 set of experiments, comparing 3 delay path generation algorithm. We can see, the LD/RPath algorithm is very close to Optimal algorithm, are better than Random-Best. statistical information discovery. In a 50 experiment, a 44 LD/Rpath delay path generated by the algorithm is smaller than the Random-Best algorithm, a the path with the Optimal algorithm to generate the same 24. Figure 2 (b) is the reliability comparison, in the 50 set of experiments, the reliability of route LD/RPath generated by the algorithm is 26 times more than the Random-Best algorithm, 1 have 6 times more than the Optimal algorithm. Figure 2 (c) is in contrast to delay /

reliable ratio, delay / observe the path to produce LD/RPath and Optimal algorithm is very close to the reliable, are better than in most cases Random-Best algorithm. The results show that, in the 50 set of experiments, a Random-Best algorithm is better than the LD/RPath algorithm 42 times, 9 times better than Optimal algorithm.

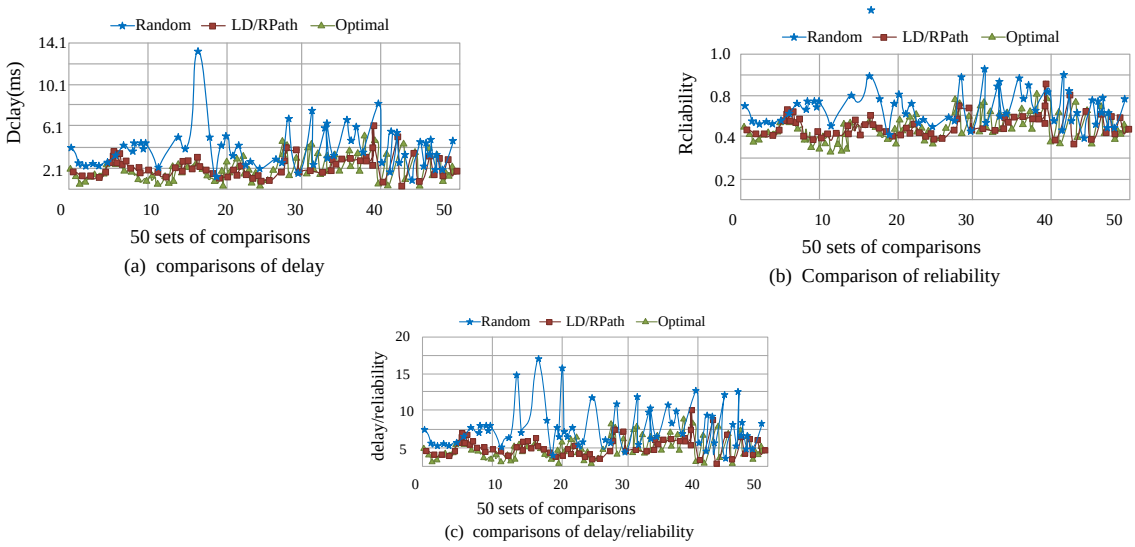

Figure2. Three kinds of algorithms the delay, reliability and delay / reliable than contrast

Conclusion

Aiming at the problems in service oriented real-time multimedia transmission, such as a long delay, frequent jitter and low reliability, this paper proposes LD/RPath algorithm LD/RPath estimates the dynamic data volume on service nodes and links through reasonable data volume approximation. And the data splitting technique is imported to convert the node delay into the edge delay. In the mean time, the reliability of nodes is considered so that the multimedia delivery problem is transformed into a conventional shortest path problem. The innovations of this algorithm are as follows: the reliability is integrated into the edge weights reasonably, which guarantee the reliability in the choice of the shortest path; the reasonable approximate of data reduces the problem's complexity; node split integrates node weights into edge weights.

Acknowledgement

The Research Is Supported By Henan vocational education reform project topic "new farmers miniature vocational training platform for new research" (ZJC14002)

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