Design document

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What I implement?

Implment a DHT Content provider which store the <key,value> pairs around the DHT ring. This DHT Content Provider hide any communication protocol detail from user.

What Commponents are provided?

- Class DBHelper is a SQLite wrapper.
- Class SimpleDhtProvider is the content provider. SimpleDhtProvider.query(), insert() are modified to support DHT query and insert.
- Class OnGdumpClickListener support “Gdump” button.
- Class OnLdumpClickListener support “Ldump” button.

How to form the DHT ring?

1. The first node is a leader, it is assumed that the first node start up the most early. When every node startup, it report its IP address/Port and Node Id to the leader.
2. After the leader node receive the information of the nodes, it sort according to hashed Node Id, then notify every node its predecessor and successor. So the Ring topology is formed.

When new node startup, how to handle?

1. When new node startup, it report its IP address/Port and Node Id to the leader.Below is the psedu code:

Join()

{Send_to_leader(node_id, ip address, port);

}

2. When leader receive join information from new node, it insert the hashed node id to ring, and find the neighboring nodes of the new inserted node, and update the predecessor and successor of the current node, update the predecssor of the next node, update the successor the previous node.

Recv(node_id,ip address, port)

{

insert node_id to linklist;

pre_node_id = linklist.pre(node_id);

succ_node_id=linklist.succ(node_id);

update_pred(node_id,pre_node_id);

update_succ(node_id, succ_node_id);

update_succ(pre_node_id, node_id);

update_pred(succ_node_id, node_id);

}

How to handle the insertion of a pair?

If the key is local, insert to the current node. If no, pass the pair to the successor.

How to handle the query of a key?

If the key is local, query the key on current node. If no, pass the key to the successor.

When pass the query cmd around the ring, pigback the original node id and IP address in the message.

If the key is local and found, then send the found pair back to the original node which deliver the command.

If the key is local and not found, then send “not found” to the original node.

How to handle Ldump?

It is straitfoward. Just dump all pairs in the current node.

How to handle Gdump?

Pass the cmd around the ring. Pigback the original node id and IP address in the message. Find all pairs in every node, and send back to the original node which deliver the command.

When new node join, the already-stored data will be re-distributed?

Answer:no, this version does not support it.

When I learn from this assignment?

1. ContentProvider.onCreate() called by main application thread, and can not perform network I/O on the main application thread, so network I/O must be moved to AsyncTask.
2. Class MatrixCusror can covert an array to Cursor, and pass the <key,value> pairs from Content Provider to content resolver.