

WHAT IS CLAIMED IS:

1                    1.     A method for performing a key range lookup, comprising:  
2                    receiving a first key;  
3                    identifying a key range tree map associated with the first key from a  
4 plurality of key range tree maps, individual key range tree maps mapping a set of  
5 minimum range values to a set of index values;  
6                    determining an index value associated with a second key using the  
7 identified key range tree map, the second key being associated with the first key;  
8                    determining transaction processing data associated with the first key  
9 using the index value, wherein utilizing the plurality of key range tree maps enables a  
10 key range search to be performed using on-board memory of an electronic device;  
11 and  
12                    providing the determined transaction processing data associated with  
13 the first key.

1                    2.     The method of claim 1, wherein the second key is a minimum  
2 range value corresponding to a range.

1                    3.     The method of claim 1, wherein identifying the key range tree  
2 map associated with the first key from the plurality of key range tree maps  
3 comprises:  
4                    hashing the first key to produce a hashed key;  
5                    obtaining a hash map that maps a set of hashed keys to the plurality of  
6 key range tree maps, the hash map being configured to be loaded into on-board  
7 memory of the electronic device;  
8                    inputting the hashed key into the hash map; and  
9                    outputting the key range tree map corresponding to the hashed key.

1                    4.     The method of claim 1, wherein determining the index value  
2 associated with the second key comprises:  
3                    determining the second key from the first key, the second key  
4 corresponding to a minimum range value;

5                   inputting the second key into the key range tree map, the key range  
6 tree map being configured to be loaded into on-board memory of the electronic  
7 device; and  
8                   outputting the index value corresponding to the second key.

1                   5.       The method of claim 1, wherein determining transaction  
2 processing data associated with the first key using the index value comprises:  
3                   obtaining an indexed list, the indexed list mapping a plurality of index  
4 values to a plurality of transaction processing data, the indexed list being configured  
5 to be loaded into on-board memory of the electronic device;  
6                   inputting the index value into the indexed list; and  
7                   outputting the transaction processing data corresponding to the index  
8 value.

1                   6.       The method of claim 1, further comprising determining a  
2 maximum range value associated with the first key using the index value.

1                   7.       The method of claim 6, wherein determining the maximum  
2 range value associated with the first key using the index value comprises:  
3                   obtaining an indexed list, the indexed list mapping a plurality of index  
4 values to a plurality of maximum range values, the indexed list being configured to  
5 be loaded into on-board memory of the electronic device;  
6                   inputting the index value into the indexed list; and  
7                   outputting the maximum range value corresponding to the index value.

1                   8.       The method of claim 1, wherein the method is performed on a  
2 single computing device of a distributed computing system.

1                   9.       The method of claim 1, wherein the method enables a key  
2 range search to be performed in constant  $\log(n)$  algorithmic efficiency.

1                   10.      The method of claim 1, wherein the plurality of key range tree  
2 maps comprise minimum range values associated with a data set, and wherein the  
3 identified key range tree map associated with the first key comprises a subset of the  
4 minimum range values associated with the data set.

1                   11.    A system, comprising:  
2                   one or more manager nodes, a manager node of the one or more  
3 manager nodes comprising:  
4                   a first processor, and  
5                   a first computer readable medium coupled to the first processor,  
6 the first computer readable medium comprising first code, executable by the  
7 first processor, for implementing a first method comprising:  
8                   receiving a request message, the request message  
9 comprising a first key;  
10                  transmitting at least a portion of the request message to  
11 one or more worker nodes of a plurality of worker nodes;  
12                  receiving a response message associated with the  
13 request message; and  
14                  transmitting the response message; and  
15 the plurality of worker nodes, a worker node of the plurality of worker  
16 nodes comprising:  
17                  a second processor, and  
18                  a second computer readable medium coupled to the second  
19 processor, the computer readable medium comprising second code,  
20 executable by the second processor, for implementing a second method  
21 comprising:  
22                  identifying a tree map of a plurality of tree maps using the  
23 first key and a hash map;  
24                  determining an index value associated with a second key  
25 using the identified tree map, wherein using the identified tree map  
26 enables the index value to be determined using on-board memory of  
27 the worker node;  
28                  determining transaction processing data associated with  
29 the second key utilizing the index value and an indexed list, the  
30 indexed list comprising a plurality of index values individual associated  
31 with a set of transaction processing data; and  
32                  providing the determined transaction processing data.

1                   12.     The system of claim 11, wherein the first key is an  
2 alphanumeric value and the second key is a minimum range value corresponding to  
3 a range that is associated with the first key.

1                   13.     The system of claim 11, wherein identifying a tree map of the  
2 plurality of tree maps using the first key and the hash map comprises:  
3                   hashing the first key to produce a hashed key;  
4                   obtaining a hash map configured to be stored in on-board memory of  
5 the manager node, the hash map mapping a plurality of keys to the plurality of tree  
6 maps;  
7                   inputting the hashed key into the hash map; and  
8                   outputting the tree map of the plurality of tree maps, the tree map  
9 corresponding to the hashed key.

1                   14.     The system of claim 11, wherein determining the index value  
2 associated with the second key comprises:  
3                   determining the second key using the first key, the second key  
4 corresponding to a minimum range value of a range;  
5                   inputting the second key into the tree map, the tree map being  
6 configured to be loaded into on-board memory of the electronic device; and  
7                   outputting the index value corresponding to the second key.

1                   15.     The system of claim 11, wherein determining the transaction  
2 processing data associated with the first key using the index value comprises:  
3                   accessing an indexed list, the indexed list mapping a plurality of index  
4 values to a plurality of transaction processing data;  
5                   inputting the index value into the indexed list; and  
6                   outputting the transaction processing data corresponding to the index  
7 value.

1                   16.     The system of claim 11, wherein the second method further  
2 comprises determining a maximum range value associated with the first key using  
3 the index value and an additional indexed list.

1                   17.     The system of claim 16, wherein determining the maximum  
2 range value associated with the first key using the index value comprises:  
3                   accessing the additional indexed list, the additional indexed list  
4 mapping a plurality of index values to a plurality of maximum range values;  
5                   inputting the index value into the additional indexed list; and  
6                   outputting the maximum range value corresponding to the index value.

1                   18.     The system of claim 11, wherein the plurality of tree maps  
2 comprise minimum range values associated with a data set, and wherein the tree  
3 map associated with the first key comprises a subset of the minimum range values  
4 associated with the data set.

1                   19.     An electronic device, comprising:  
2                   a processor, and  
3                   a computer readable medium coupled to the processor, the computer  
4 readable medium comprising code, executable by the processor, for implementing a  
5 method comprising:  
6                   receiving an identifier associated with a dataset;  
7                   generating an indexed list from a data set, the indexed list  
8 mapping a plurality of index values to a plurality of transaction processing  
9 data of the data set;  
10                  storing the indexed list; and  
11                  for each entry of the indexed list:  
12                      determining a minimum range value of a range  
13 associated with the entry of the indexed list;  
14                      updating a tree map comprising the minimum range value  
15 and an index value associated with the entry of the indexed list; and  
16                      updating a hash map with an alphanumeric identifier and  
17 an identifier of the tree map.

1                   20.     The electronic device of claim 19, wherein the method further  
2 comprises:  
3                   determining that a set of ranges associated with the transaction  
4 processing data of the data set are non-contiguous;

5                    in response to determining that the set of ranges associated with the  
6 transaction processing data of the data set are non-contiguous, generating an  
7 additional indexed list from the data set, the additional indexed list mapping the  
8 plurality of index values to a plurality of maximum range values of the set of ranges;  
9 and  
10                    storing the additional indexed list.