IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

BACKGROUND

[0001] MapReduce is a programming methodology to perform parallel computations over distributed (typically, very large) data sets. Some theory regarding the MapReduce programming methodology is described in "MapReduce: Simplified Data Processing on Large Clusters," by Jeffrey Dean and Sanjay Ghemawat, appearing in OSDI'04: Sixth Symposium on Operating System Design and Implementation, San Francisco, CA, December, 2004 (hereafter, "Dean and Ghemawat"). A similar, but not identical, presentation is also provided in HTML form at the following URL: http://labs.google.com/papers/mapreduce-osdi04-slides/index.html (hereafter, "Dean and Ghemawat HTML").

[0002] Basically, a "map" function maps key-value pairs to new (intermediate) key-value pairs. A "reduce" function represents all mapped (intermediate) key-value pairs sharing the same key to a single key-value pair or a list of values. The "map" and "reduce" functions are typically user-provided. The map function iterates over a list of independent elements, performing an operation on each element as specified by the map function. The map function generates intermediate results. The reduce operation takes these intermediate results via a single iterator and combines elements as specified by the reduce function.

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SUMMARY

[0003] In accordance with an aspect, an input data set is treated as a plurality of grouped sets of key/value pairs, which enhances the utility of the MapReduce programming methodology. Utilizing such grouping, map processing is carried out independently on two or more related datasets (e.g., related by each being characterized by a schema with a key in common). The intermediate results of the map processing (key/value pairs) for a particular key are processed together in a single reduce function by applying a different iterator to intermediate values for each group. Different iterators can be composed inside reduce functions in ways however desired.

[0004] Thus, for example, the enhanced MapReduce programming methodology may be easily employed to carry out distributed relational database processing.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Fig. 1 illustrates an example of the conventional MapReduce architecture.

[0006] Fig. 2 illustrates a specific parallel implementation of the Fig. 1 architecture.

[0007] Fig. 3 graphically illustrates a join performed over two relational tables that have different schema.

[0008] Fig. 4 illustrates a particular implementation of an improved MapReduce architecture that includes consideration for input groups, relative to the Fig. 3 example relational tables.

[0009] Fig. 5 schematically illustrates, in greater detail, processing by the improved MapReduce architecture to join the records (Fig. 3) of the Employee table 302 with the records of the Department table 304 to generate the Employee and Department table 306.

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DETAILED DESCRIPTION

[0010] The inventors have realized that, by treating an input data set as a plurality of grouped sets of key/value pairs, the utility of the MapReduce programming methodology may be enhanced. By utilizing such a grouping, map processing can be carried out independently on two or more related datasets (e.g., related by being characterized by a common key). The intermediate results of the map processing (key/value pairs) for a particular key can be processed together in a single reduce function by applying a different iterator to intermediate values for each group.

[0011] Before discussing the aspect in which the input data set is treated as a plurality of grouped sets of key/value pairs, it is useful to first discuss, as background, the conventional architecture. The conventional architecture is described, for example, in Dean and Ghemawat referred to in the Background. Fig. 1, illustrating an example of the conventional architecture, which is substantially reproduced from Dean and Ghemawat HTML (at slide 7) but with reference numerals added here to aid in the description. In the example, the keys of the input data key/value pairs comprise keys k1 to k5.

[0012] As discussed by Dean and Ghemawat, and as shown in the Fig. 1 illustration, both the input data set 102 and the output data set 114 are a set of key value pairs. The programmer specifies a map function that processes input key/value pairs and produces a set of intermediate pairs 106(1) through 106(7). In the abstract, such a map function is specified as follows:

$$\text{map (in\_key, in\_value)} \rightarrow \text{list(out\_key, intermediate\_value)}$$

In the Fig. 1 illustrative example, the input data set 102 is partitioned into an arbitrary grouping of seven partitions 102(1) through 102(7). Each partition is provided to the corresponding invocation of the map function, which has seven invocations 104(1) through 104(7).

[0013] The group-by-key functionality 108 partitions the intermediate results by out_key, and the intermediate partitions 110(k1) to 110(k5) are provided to the corresponding

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reduce functions 112(k1) to 112(k5), respectively. Each reduce function 112(k1) to 112(k5) processes intermediate data from one of the intermediate partitions 110(k1) to 110(k5) to generate the corresponding output partitions 114(k1) to 114(k5). In the abstract, such a reduce function is specified as follows:

$$\text{reduce (out\_key, list(intermediate\_value))} \rightarrow \text{list(out\_value)}$$

The reduce function combines all intermediate values for a particular key and produces a set of merged output values for the key, usually just one.

[0014] Fig. 2 illustrates a parallel implementation of the Fig. 1 architecture. For simplicity of illustration, only some of the elements in Fig. 2 are denoted by reference numerals, and it is clearly evident that others of the elements correspond to elements in Fig. 1. In the implementation, the map functions 104 are partitioned into a user-configurable number of map tasks 202a, 202b and 202c (here, three map tasks). Similarly, the reduce functions are partitioned into a user-configurable number of reduce tasks 208a and 208b (here, two reduce tasks). Each map task 202a, 202b, and 202c includes a partitioning function 206a, 206b and 206c, respectively, that partitions the intermediate data across the reduce tasks 208a and 208b. Each reduce task 206a and 206b includes a sort and group-by-key task 210a and 210b, respectively, which can make the processing of the output data more efficient and/or convenient.

[0015] Although not shown in Figs. 1 and 2, the partitioned data can go through a configurable, intermediate step in which a "combiner" function is called. A combiner function is similar to a reduce function with the following difference: a combiner runs after a mapper and performs a partial merging on each partition before they are transferred to a reducer. This helps reduce the network traffic and speed up the total execution time.

[0016] Conventional MapReduce implementations enable the use of massive clusters of commodity computers to provide a simplified programming and execution model for processing large sets of data in parallel. In addition, the application is isolated from

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messy but important details of running a distributed program on massive clusters of potentially unreliable computers. However, the conventional MapReduce implementations do not have facility to efficiently process data from heterogeneous sources.

[0017] For example, it is impractical to perform joins over two relational tables that have different schemas. Fig. 3 graphically illustrates such a join (without regard for any particular method or architecture for accomplishing such the join). Referring to Fig. 3, there are two tables, an "Employee" table 302 and a "Department" table 304 on which it may be desirable to perform a join operation. Each employee record in the Employee table 302 has key DeptID and value LastName, and each department record in the Department table 304 has DeptID and value DeptName. The result "Employee and Department" table 306 is a table that shows the department name for each employee. More specifically, the records of the Employee table 302 are joined with the records of the Department table 304 such that each record of the Employee and Department table 306 includes key DeptID and values LastName and DeptName.

[0018] Fig. 4 illustrates an example of an improved MapReduce architecture in accordance with an aspect, and relative to the Fig. 3 example relational tables. It is noted that the schema of each data set, such as the Fig. 3 relational tables, includes a set of attributes (such as DeptID, LastName, DeptName) and their properties (such as their data types: integer DeptID, string LastName, string DeptName). As discussed above with respect to the conventional MapReduce architecture, input, intermediate and output data sets may each be characterized by their own schema, and each schema operates according to "key/value" pairs. The attributes in the key/value pairs may be distinct or overlapping; moreover, keys within a data set may be distinct or identical.

[0019] In the improved MapReduce architecture such as discussed with reference to Fig. 4, the input, intermediate and output data sets are partitioned into a set of data groups. With the partitioning into groups, it is likely that map functions corresponding to each group are different; data sets within the same group are characterized by the same schema; and data sets within different groups are characterized by different schemas. it is

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also likely that map functions corresponding to each group are the same; data sets within all the groups are the same.

[0020] In general, partitioning the data sets into data groups enables a mechanism to associate (group) identifiers with data sets, map functions and iterators (useable within reduce functions to access intermediate data) and, also, to produce output data sets with (group) identifiers. It is noted that the output group identifiers may differ from the input/intermediate group identifiers.

[0021] Referring now to Fig. 4, each of the map tasks 402 and 404 are configured to operate on separate data groups, where each of the separate data groups is characterized by its own schema. In Fig. 4, the separate tables are labeled "E" and "D" to represent the "Employee" table 302 and the "Department" table 304, respectively.

[0022] Referring still to Fig. 4, the records of the intermediate data E' and D' retain an identification with the groups to which the original input data, resulting in particular intermediate data, belong. Thus, the intermediate data E' retains an identification with group E, and the intermediate data D' retains an identification with group D. That is, the intermediate data E' of the map task 502 retains an identification with the employee table 302, and the intermediate data D' of the map task 504 retains an identification with the department table 304.

[0023] Even the records of the partitioned data 406 and 408, after partitioning the records of the intermediate data to the various reduce tasks 410 and 412, retain an identification with the groups of the original input data (the employee table 302 and the department table 304). The reduce tasks 410 and 412 can access partitioned intermediate data for both groups 302 and 304 through one iterator per group, and the reduce tasks 410 and 412 can be programmed by users to use the iterators however desired.

[0024] In accordance with the described aspect, a programmer may view data as follows:

input data	grouped sets of key/value pairs
intermediate data	grouped sets of key/value pairs
output data	(possibly grouped) sets of

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key/value pairs or values

It is noted that the output data does not have to be grouped or key/value pairs, but it is useful in some instances, such as some instances in which MapReduce jobs are to be chained in a pipeline. It is also noted that there can be only one group.

[0025] We now provide some example syntax for map and reduce functions to employ the improved MapReduce architecture. As discussed above, a user/programmer typically provides map and reduce functions. In accordance with the described aspect, in the abstract, a map function may be specified as follows:

Map(group_id, in_key, in_value) → (group_id, list(out_key, intermediate_value))

Thus, for a particular group identified with a group_id, the map function processes each input key/value pair and produces one or more intermediate key/value pairs. In accordance with the described aspect, in the abstract, a reduce function may be specified as follows:

Reduce(list(group_id, list(out_key, intermediate_value))) → list(out_value)

Thus, the reduce function merges all intermediate data over all groups. Iterators specific to a particular group may be employed to iterate over that group's intermediate data. One or more output values are provided.

[0026] In the improved MapReduce, the partitioning operation after the mapping phase is generalized such that it has a configurable operation with two modes.

[0027] In the partitioning mode 1, the partitioning operation partitions the intermediate data into R partitions, where R is the number of reduce tasks. Each key/value pair goes to only one of the partitions. This is similar to what is done by the conventional MapReduce.

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[0028] In the partitioning mode 2, it still partitions the intermediate data into R partitions but each key/value pair can go to a plurality of the partitions. In this mode, it is likely that the pairs will go to all the partitions.

[0029] For example, consider implementing a cross product of the tables in Fig. 3, in which every record of the Employee table 302 will be paired with every record of the Department table 304. The cross product can be achieved using two nested loops, one outer loop iterating over the records of the Employee table and one inner loop iterating over the records of the Department table. In the improved MapReduce, one possible implementation can map each employee to only one reducer but it can map each department to every reducer. In another possible implementation, it can map each employee to only one reducer and it may not map the departments at all. Instead, each reducer can read the departments directly from their local copy, if exists, or from a copy shared by the other reducers.

[0030] In the improved MapReduce, the operations can collect information about the data that they are processing. They can also save the information as metadata of the corresponding data. For example, the partitioning, grouping, and sorting operations can keep the smallest and largest keys in each partition processed. This information can be saved as part of the metadata of each partition. When an iterator is created to scan through the records of a partition, this metadata can be made available to the reduce function through the iterators. One example benefit is that this metadata can speed up comparisons. For example, in a processing of the data to find all records whose keys are smaller than a particular key, an entire partition can be skipped if its smallest key is larger than the particular key.

[0031] In some examples, the sorting operation is configurable, such that it can be turned on or off for some groups. This is in addition to the configurable sorting function that is also available in the conventional MapReduce. As such, the overhead to perform some operations may be reduced where, for example, sorting is not needed. One example of such a database operation is determining a cross product.

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[0032] In the improved MapReduce, the reduce function has a configurable operation with three modes. They are named in the increasing order of generality as follows: the reduce mode 1, the reduce mode 2, and the reduce mode 3. These modes improve its capabilities to support the basic relational database processing operations. In all modes, the data accessible through the iterators over all groups are made available the reducer functions.

[0033] In the reduce mode 1, the records input to a reduce function through the group iterators carry or share the same key. If there is no record in a group that has the same key, the corresponding iterator is null. This mode helps implement an equijoin, a join over equal keys, efficiently. For example, it can produce the "Employee and Department" table 306 by equijoining the "Employee" table 302 and the "Department" table 204.

[0034] In the reduce mode 2, the records input to a reduce function through the group iterators need not carry the same key. The input records are the ones pointed to by the group iterators when the reduce function is invoked. The reduce function controls the manner in which keys, values, and iterators are used. This mode helps implement a join with an arbitrary predicate (such as comparisons) because it can implement the sort-merge join. For example, this mode together with the partitioning mode 2 can even implement the cross product of the employees and departments in Fig. 3.

[0035] In the reduce mode 3, the records input to a reduce function through the group iterators need not carry the same key as in the reduce mode 2. In addition, those of some groups need not even come from the intermediate data when the reduce function is invoked. They can come from data local to the reduce function or data shared by other reduce functions. For example, this mode can implement the cross product of the employees and departments in Fig.3. To do that, the departments data can be accessed by every reduce function.

[0036] In the improved MapReduce, the map and reduce functions can be provided by the application developers or users. They can also be generated by a tool or program. For example, consider implementing the select operation of relation database processing to

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get from a given table those employees whose salary is larger than a certain limit. Using the schema of the data, it is possible for a tool or program to automatically generate a map function to implement this select operation. The automatic generation allows building higher-level interfaces on top of the improved MapReduce.

[0037] We now discuss an example, using psuedocode, of code to accomplish joining the records of the Employee table 302 with the records of the Department table 304, as discussed above relative to Figs. 3 and 4, such that each record of the Employee and Department table 306 includes values LastName and DeptName, with the records sorted by the DeptID key. This example will use the reduce mode 1. The map functions may be defined as follows:

```
map(string group, string key, string val) {
        // group: "emp" or "dept"
        // key: DeptID
        // val: LastName for "emp", DeptName for "dept"
        DeptID = key;
        emit_to_group(group, DeptID, val);
  }
```

The reduce functions may be defined as follows:

```
reduce(hashtable iterators) {
        // iterators: one iterator for "emp", another for "dept"
        DeptID = iterators.get_key();
        emp_iter = iterators["emp"].get_iter();
        dept_iter = iterators["dept"].get_iter();
        for each LastName in emp_iter do  {
                for each DeptName in dept_iter do  {
                        emit_to_group("emp_dept", DeptID, (LastName,
                        DeptName));
                }
        }
  }
```

If null iterators are possible and the database operation such as outer joins needs their handling, the reduce functions may also be defined as follows:

```
reduce(hashtable iterators) {
        // iterators: one iterator for "emp", another for "dept"
```


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```
        DeptID = iterators.get_key();
        emp_iter = iterators["emp"].get_iter();
        dept_iter = iterators["dept"].get_iter();
        if (emp_iter is not null and dept_iter is not null) then {
                for each LastName in emp_iter do  {
                        for each DeptName in dept_iter do  {
                                emit_to_group("emp_dept", DeptID, (LastName,
                                DeptName));
                        }
                }
        }
        else if (emp_iter is not null and dept_iter is null) then {
                // null iterator handling for left and full outer joins
                for each LastName in emp_iter do {
                        emit_to_group("emp_dept", DeptID, (LastName, null));
                }
        }
        else if (emp_iter is null and dept_iter is not null) then {
                // null iterator handling for right and full outer joins
                for each DeptName in dept_iter do {
                        emit_to_group("emp_dept", DeptID, (null, DeptName));
                }
        }
        else {
                // both iterations being null can be a warning or an error
        }
}
```

As mentioned above, the output group identifiers may be different from the input/intermediate group identifiers. For example, the reduce functions above produce output data set with the "emp_dept" group identifier from intermediate data sets with the "emp" and "dept" group identifiers.

[0038] It is noted that the use of the iterators is flexible, so that the programmer can use the iterators as desired to accomplish a desired function. It is also noted that the data structure to implement iterators can be any data structure that can efficiently return the iterator of a group given the group identification. Hash table is only one example of such a data structure.

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[0039] It is further noted that the iterators can carry metadata for the data that they are created for. The metadata may include various statistics. This capability is in addition to the counter facility that the conventional MapReduce provides.

[0040] Having provided an example of the code for the map and reduce functions to accomplish joining the records of the Employee table 302 with the records of the Department table 304, we now discuss an example execution of the map and reduce functions. For example, the map function may be called as follows:

map("emp", 34, "Smith")

which results in the data "34 Smith" being emitted into files with an "emp" extension. The "emp" extension identifies the data with the "emp" group. The map function may further be called as follows:

map("dept", 34, "Clerical")

which results in the data "34 Clerical" being emitted into files with a "dept" extension. There would further be additional calls to the map function that are not listed here.

[0041] The reduce function may be called as follows:

reduce((34, ("emp", ("Smith", "Robinson", "Jasper")), ("dept", ("Clerical"))))

A partial example output of the reduce function may then be as follows:

"34, Smith, Clerical"
"34, Robinson, Clerical"
"34, Jasper, Clerical"

It is noted that the output will be sorted by the DeptID record as a side-effect of MapReduce. The sorting happens in both the conventional MapReduce and the improved MapReduce although it can also be turned off in the improved MapReduce.

[0042] Fig. 5 more fully illustrates, with the full data of the Employee table 302 and the Department table 304, processing by an example of the improved MapReduce to equijoin

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the records of the Employee table 302 with the records of the Department table 304 to generate the Employee and Department table 306, where each record shows the department name for one employee. Referring specifically to Fig. 5, the Employee table 302 and the Department table 304 are shown in the portion 502 of Fig. 5. The map functions are shown within the portion 504 of Fig. 5.

[0043] The portion 506 of Fig. 5 includes the intermediate results of applying the map functions followed by the partitioning into even-keyed records and odd-keyed records. This partitioning function is just one of many possible partitioning functions. The intermediate results within the portion 506 are analogous to the boxes labeled E' and D' within map tasks 402 and 404 in Fig. 4. The intermediate results within the portion 508 in Fig. 5 are analogous to the partitioned results 406 and 408 in Fig. 4. In Fig. 5, the partitioning results are sorted into even-keyed records 509a and odd-keyed records 509b. The sorted partitioned results within portion 508 are provided to reduce functions within the portion 510, and the portion 512 includes the result Employee and Department table 306. It is noted that in the special case of department ID 35, there are no employees in the Employee table 502 for department ID 35, so the record in the Employee and Department table 306 for department ID 35 was generated based on a null iterator for the employee group. (In general, a null iterator can occur for both groups. The null iterators are handled in reduce functions in the way that the programmer desires. For example, as discussed before, outer join types utilize the generation of an output record with some null attribute values.)

[0044] As discussed, then, the MapReduce concept may be utilized to carry out map processing independently on two or more related datasets (e.g., related by being characterized by a common key) even when the related data sets are heterogeneous with respect to each other, such as data tables organized according to different schema. The intermediate results of the map processing (key/value pairs) for a particular key can be processed together in a single reduce function by applying a different iterator to intermediate values for each group. In this way, operations on the two or more related datasets may be carried out more efficiently or in a way not even possible with the conventional MapReduce architecture.

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What is claimed is:

1. A method of processing data of a data set, wherein the data set comprises a plurality of data groups, the method comprising:

for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and

reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group.

2. The method of claim 1, wherein:

the at least one output data group is a plurality of output data groups.

3. The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

4. The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group.

5. The method of claim 1, wherein:

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processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group.

6. The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

7. The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

8. The method of claim 7, wherein:

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in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions.

9. The method of claim 7, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

10. The method of claim 9, wherein:

the reducing step includes processing the metadata.

11. The method of claim 10, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step.

12. The method of claim 5, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key than the iterator corresponding to another particular data group, for that reducer.

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13. The method of claim 1, wherein:

the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data.

14. The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

15. The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

16. A method of relating data among a plurality of data groups, the method comprising:

for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and

reducing the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the reducing step includes relating the data among the plurality of data groups.

17. A method of configuring a data processing system to process data of a data set, wherein the data set comprises a plurality of data groups, the method comprising:

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for each one of the data groups, configuring the data processing system to include a mapping function that configures the data processing system to map the data of that data group to corresponding intermediate data for that data group, wherein the data processing system ensures that the corresponding intermediate data is identifiable to a data group; and

configuring the data processing system to include at least one reducing function that configures the data processing system to reduce the intermediate data for the data groups to at least one output data group, including to process the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the data processing system provides an iterator corresponding to each of the data groups.

18. The method of claim 17, further comprising:

configuring group identifications and the corresponding data and functions.

19. The method of claim 17, wherein:

the data processing system is such that a partitioning function provides the intermediate data to a plurality of partitions; and

the method further comprises configuring partitioning modes such that each key/value pair of the intermediate data goes to only one of the partitions or such that at least some of the key/value pairs goes to more than of the partitions.

20. The method of claim 17, wherein:

the data processing system is operable in one of three reduce modes, a first reduce mode in which the records input to a reduce function through the group iterators carry or share the same key, a second reduce mode in which the records input to a reduce function through the group iterators need not carry the same key; and a third reduce mode in which the records input to a reduce function through the group iterators need not carry

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the same key and the records input a reduce function may not come from the intermediate data; and

the method further comprises configuring the reduce mode in which the data processing system is operable.

21. The method of claim 17, wherein:

the data processing system is operable to include a combining function between the map function and the reduce function; and

the method further comprises configuring the combining function.

22. The method of claim 17, wherein:

the data processing system is operable such that the reducing function includes a sorting capability;

the method further comprises configuring the sorting capability of the reducing function.

23. The method of claim 17, wherein:

the data processing system is operable such that the reducing includes a group-by-key and sort functionality and metadata is generated and provided for at least some of the mapping, partitioning, grouping and sorting; and

the method further comprises configuring the metadata generation and providing.

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24. A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured to:

for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and

reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group.

25. The computer system of claim 24, wherein:

the at least one output data group is a plurality of output data groups.

26. The computer system of claim 24, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

27. The computer system of claim 26, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group.

28. The computer system of claim 24, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each

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data group, the computer system being configured to employ an iterator that corresponds to that data group.

29. The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers configured to reduce the intermediate data; and

the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

30. The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers configured to reduce the intermediate data; and

the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

31. The computer system of claim 30, wherein:

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the computer system is configured to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions.

32. The computer system of claim 30, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the computer system is further configured to

generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

33. The computer system of claim 32, wherein:

the reducing includes processing the metadata.

34. The computer system of claim 33, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing.

35. The computer system of claim 28, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key than the iterator corresponding to another particular data group, for that reducer.

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36. The computer system of claim 24, wherein:

the intermediate data processing of the reducing further comprises processing data that is not intermediate data.

37. The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

38. The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

39. A computer system configured to relate data among a plurality of data groups, the computer system configured to:

for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and

reduce the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the reducing step includes relating the data among the plurality of data groups.

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40. A computer system of configuring a data processing system to process data of a data set, wherein the data set comprises a plurality of data groups, the method comprising:

for each one of the data groups, configuring the data processing system to include a mapping function that configures the data processing system to map the data of that data group to corresponding intermediate data for that data group, wherein the data processing system ensures that the corresponding intermediate data is identifiable to a data group; and

configuring the data processing system to include at least one reducing function that configures the data processing system to reduce the intermediate data for the data groups to at least one output data group, including to process the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the data processing system provides an iterator corresponding to each of the data groups.

41. The method of claim 40, further comprising:

configuring group identifications and the corresponding data and functions.

42. The method of claim 40, wherein:

the data processing system is such that a partitioning function provides the intermediate data to a plurality of partitions; and

the method further comprises configuring partitioning modes such that each key/value pair of the intermediate data goes to only one of the partitions or such that at least some of the key/value pairs gos to more than of the partitions.

43. The method of claim 40, wherein:

the data processing system is operable in one of three reduce modes, a first reduce mode in which the records input to a reduce function through the group iterators carry or

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share the same key, a second reduce mode in which the records input to a reduce function through the group iterators need not carry the same key; and a third reduce mode in which the records input to a reduce function through the group iterators need not carry the same key and the records input a reduce function may not come from the intermediate data; and

the method further comprises configuring the reduce mode in which the data processing system is operable.

44. The method of claim 40, wherein:

the data processing system is operable to include a combining function between the map function and the reduce function; and

the method further comprises configuring the combining function.

45. The method of claim 40, wherein:

the data processing system is operable such that the reducing function includes a sorting capability;

the method further comprises configuring the sorting capability of the reducing function.

46. The method of claim 40, wherein:

the data processing system is operable such that the reducing includes a group-by-key and sort functionality and metadata is generated and provided for at least some of the mapping, partitioning, grouping and sorting; and

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the method further comprises configuring the metadata generation and providing.

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IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

ABSTRACT

An input data set is treated as a plurality of grouped sets of key/value pairs, which enhances the utility of the MapReduce programming methodology. By utilizing such a grouping, map processing can be carried out independently on two or more related but possibly heterogeneous datasets (e.g., related by being characterized by a common primary key). The intermediate results of the map processing (key/value pairs) for a particular key can be processed together in a single reduce function by applying a different iterator to intermediate values for each group. Different iterators can be arranged inside reduce functions in ways however desired.

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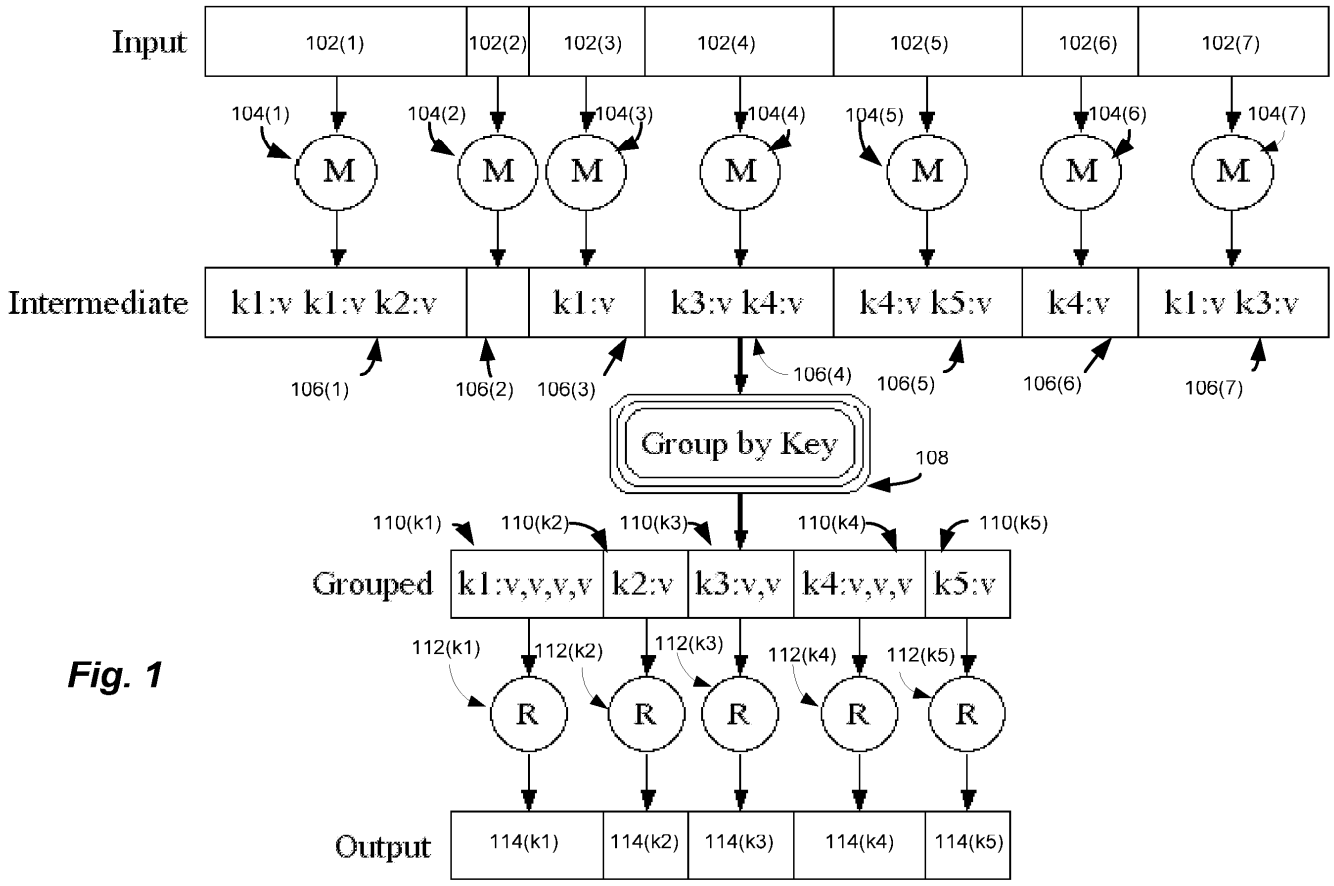

Input
102(1)
102(2)
102(3)
102(4)
102(5)
102(6)
102(7)
104(1)
104(2)
104(3)
104(4)
104(5)
104(6)
104(7)
M
Intermediate
k1:v k1:v k2:v
k1:v
k3:v k4:v
k4:v k5:v
k4:v
k1:v k3:v
106(1)
106(2)
106(3)
106(4)
106(5)
106(6)
106(7)
Group by Key
108
110(k1)
110(k2)
110(k3)
110(k4)
110(k5)
Grouped
k1:v,v,v,v
k2:v
k3:v,v
k4:v,v,v
k5:v
112(k1)
112(k2)
112(k3)
112(k4)
112(k5)
R
Output
114(k1)
114(k2)
114(k3)
114(k4)
114(k5)

Fig. 1

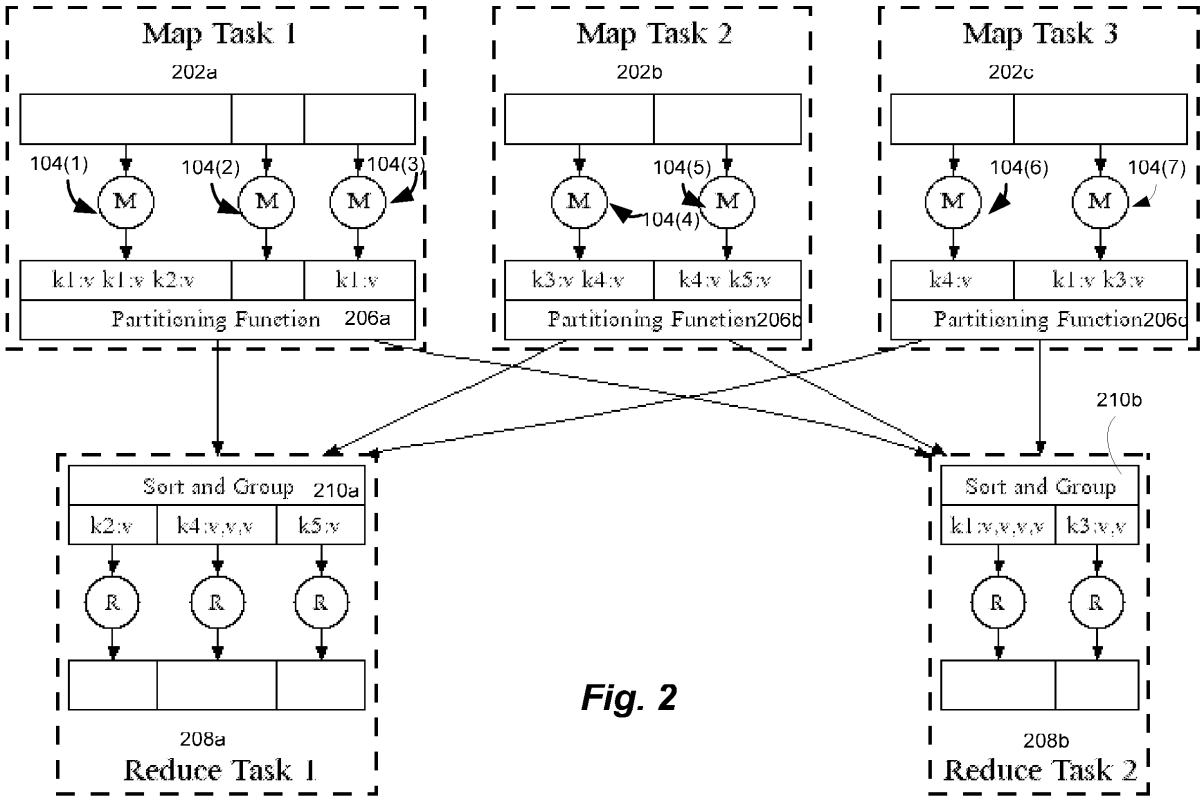

Map Task 1
202a
104(1)
104(2)
104(3)
M
k1:v k1:v k2:v
k1:v
Partitioning Function
206a
Map Task 2
202b
104(5)
104(4)
k3:v k4:v
k4:v k5:v
Partitioning Function206b
Map Task 3
202c
104(6)
104(7)
k4:v
k1:v k3:v
Partitioning Function206c
210b
Sort and Group
210a
k2:v
k4:v,v,v
k5:v
R
208a
Reduce Task 1
Sort and Group
k1:v,v,v,v
k3:v,v
208b
Reduce Task 2

Fig. 2

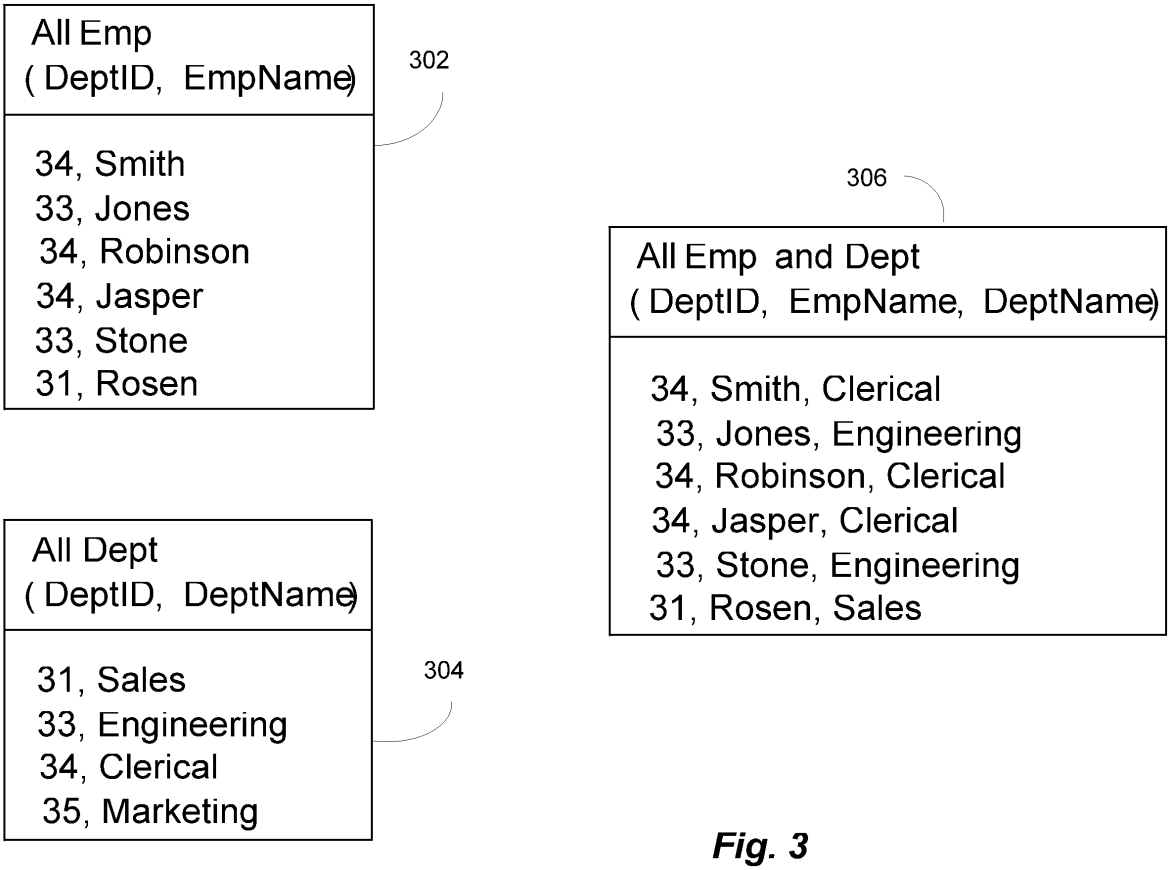

All Emp
(DeptID, EmpName)
34, Smith
33, Jones
34, Robinson
34, Jasper
33, Stone
31, Rosen
302
All Dept
(DeptID, DeptName)
31, Sales
33, Engineering
34, Clerical
35, Marketing
304
306
All Emp and Dept
(DeptID, EmpName, DeptName)
34, Smith, Clerical
33, Jones, Engineering
34, Robinson, Clerical
34, Jasper, Clerical
33, Stone, Engineering
31, Rosen, Sales

Fig. 3

Fig. 4

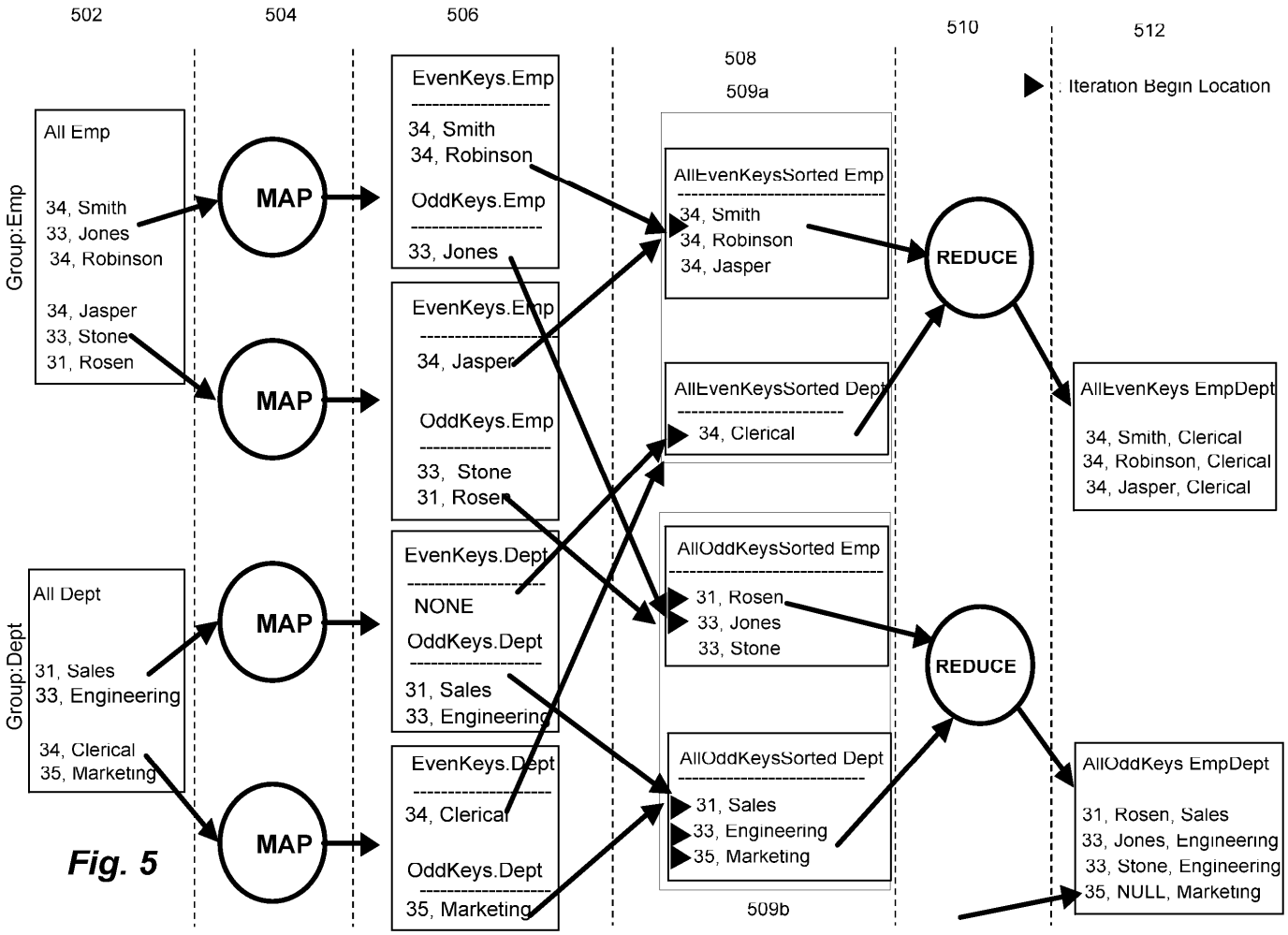

502
504
506
508
509a
510
512
Iteration Begin Location
Group:Emp
All Emp
34, Smith
33, Jones
34, Robinson
34, Jasper
33, Stone
31, Rosen
Group:Dept
All Dept
31, Sales
33, Engineering
34, Clerical
35, Marketing
MAP
MAP
MAP
MAP
EvenKeys.Emp
34, Smith
34, Robinson
OddKeys.Emp
33, Jones
EvenKeys.Emp
34, Jasper
OddKeys.Emp
33, Stone
31, Rosen
EvenKeys.Dept
NONE
OddKeys.Dept
31, Sales
33, Engineering
EvenKeys.Dept
34, Clerical
OddKeys.Dept
35, Marketing
AllEvenKeysSorted Emp
34, Smith
34, Robinson
34, Jasper
AllEvenKeysSorted Dept
34, Clerical
AllOddKeysSorted Emp
31, Rosen
33, Jones
33, Stone
AllOddKeysSorted Dept
31, Sales
33, Engineering
35, Marketing
509b
REDUCE
REDUCE
AllEvenKeys EmpDept
34, Smith, Clerical
34, Robinson, Clerical
34, Jasper, Clerical
AllOddKeys EmpDept
31, Rosen, Sales
33, Jones, Engineering
33, Stone, Engineering
35, NULL, Marketing

Fig. 5

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	YAH1P034/Y01708US0
	Application Number	
Title of Invention	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

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☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ali		Dasdan	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	San Jose	State/Province	CA	Country of Residence i	US

Citizenship under 37 CFR 1.41(b) i: TR

Mailing Address of Applicant:

Address 1	4708 Moorpark Ave.
Address 2	

City	San Jose	State/Province	CA
Postal Code	95129	Country i	US

Applicant 2 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Hung-Chih		Yang	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Citizenship under 37 CFR 1.41(b) i: US

Mailing Address of Applicant:

Address 1	730 E. Evelyn Ave, #814
Address 2	

City	Sunnyvale	State/Province	CA
Postal Code	94086	Country i	US

Applicant 3 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ruey-Lung		Hsiao	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Los Angeles	State/Province	CA	Country of Residence i	US

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	YAH1P034/Y01708US0
	Application Number	
Title of Invention	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	

Citizenship under 37 CFR 1.41(b) i	TW		
Mailing Address of Applicant:			
Address 1	3767 Mentone Ave. #101		
Address 2			
City	Los ngeles	**State/Province**	CA
Postal Code	90034	**Country**i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	22434		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING		
Attorney Docket Number	YAH1P034/Y01708US0	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	5	**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ Request Not to Publish. I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not been and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ US Representative (37 CFR 11.9)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	YAH1P034/Y01708US0
	Application Number	
Title of Invention	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	

Customer Number	22434

Domestic Priority Information:

This section allows for the applicant to claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c). Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)

Additional Domestic Priority Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◉ Yes ○ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1 Remove

If the Assignee is an Organization check here.	☑		
Organization Name	YAHOO! Inc.		
Mailing Address Information:			
Address 1	701 First Avenue		
Address 2			
City	Sunnyvale	**State/Province**	CA
Country [i]	US	Postal Code	94089
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	YAH1P034/Y01708US0
	Application Number	
Title of Invention	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	

Signature	/ASH/			Date (YYYY-MM-DD)	2006-10-05
First Name	Alan	Last Name	Hodes	Registration Number	38185

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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DECLARATION AND POWER OF ATTORNEY FOR ORIGINAL U.S. PATENT APPLICATION

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING** the specification of which,

(check one)

1. ☒ is attached hereto.

2. ☐ was filed on _____ as U.S. Application No. _____ and was amended on _____.

3. ☐ was filed on _____ as PCT International Application No. _____ and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Prior Foreign Application(s)

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or (f), or §365(b) of any foreign application for patent or inventor's certificate listed below, or under §365(a) of any PCT international application which designated at least one country other than the United States listed below, and I have identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed:

			Priority Not Claimed	Cert. Copy Attached
_____ (Application No.)	_____ (Country)	_____ (Filing Date)	☐	☐
_____ (Application No.)	_____ (Country)	_____ (Filing Date)	☐	☐

Power of Attorney

And I hereby appoint the law firm of **Beyer Weaver & Thomas, LLP** and all practitioners who are associated with the Customer Number 022434 as my principal attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

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Direct Correspondence To: **Customer Number 022434**

Direct Telephone Calls To: **Alan S. Hodes at telephone number (650) 961-8300**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Typewritten Full Name of Sole or First Inventor: Ali Dasdan Citizenship: Turkey

Inventor's signature: [signature] Date of Signature: Oct 04, 2006

Residence: (City) San Jose (State/Country) CA/USA

Post Office Address: 4708 Moorpark Ave., San Jose, CA 95129, USA

Second Inventor: Hung-Chih Yang Citizenship: USA

Inventor's signature: [signature] Date of Signature: Oct. 4, 2006

Residence: (City) Sunnyvale (State/Country) CA/USA

Post Office Address: 730 E. Evelyn Ave. #814, Sunnyvale, CA 94086, USA

Third Inventor: Ruey-Lung Hsiao Citizenship: Taiwan

Inventor's signature: [signature] Date of Signature: Oct. 3, 2006

Residence: (City) Los Angeles (State/Country) CA/USA

Post Office Address: 3767 Mentone Ave. #101, Los Angeles, CA 90034, USA

American Airlines/Hilton, Ex. 1004, p.40
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7065618	B1	2006-10-05	Ghemawat et al.	
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

	1	Jeffrey Dean and Sanjay Ghemawat, "MapReduce: Simplified Data Processing on Large Clusters", USENIX Association OSDI '04: 6th Symposium on Operating Systems Design and Implementation, December 6-8 2004, pp137-149.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

American Airlines/Hilton, Ex. 1004, p.42
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☑ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/ASH/	Date (YYYY-MM-DD)	2006-10-05
Name/Print	Alan S. Hodes	Registration Number	38,185

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

American Airlines/Hilton, Ex. 1004, p.43
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

American Airlines/Hilton, Ex. 1004, p.44
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor:	Ali Dasdan
Filer:	Alan S. Hodes/Laura Dean
Attorney Docket Number:	YAH1P034/Y01708US0

Filed as Large Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	300	300
Utility Search Fee	1111	1	500	500
Utility Examination Fee	1311	1	200	200
Pages:				
Claims:				
Claims in excess of 20	1202	26	50	1300
Independent claims in excess of 3	1201	3	200	600
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2900**

Electronic Acknowledgement Receipt

EFS ID:	1237450
Application Number:	11539090
Confirmation Number:	3099
Title of Invention:	IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor:	Ali Dasdan
Customer Number:	22434
Filer:	Alan S. Hodes/Laura Dean
Filer Authorized By:	Alan S. Hodes
Attorney Docket Number:	YAH1P034/Y01708US0
Receipt Date:	05-OCT-2006
Filing Date:	
Time Stamp:	18:04:41
Application Type:	Utility
International Application Number:	

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$2900
RAM confirmation Number	580
Deposit Account	500388

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part	Pages

1		YAH1P034_as_filed.pdf	94780	yes	28
	Multipart Description				
	Doc Desc		**Start**	**End**	
	Specification		1	14	
	Claims		15	27	
	Abstract		28	28	
Warnings:					
Information:					
2	Drawings	YAH1P034_Third_Draft_figs.pdf	263644	no	5
Warnings:					
Information:					
3	Application Data Sheet	US_ADS_Form_SB_14.pdf	1252593	no	5
Warnings:					
Information:					
4	Oath or Declaration filed	Declaration.pdf	116829	no	2
Warnings:					
Information:					
5	Information Disclosure Statement (IDS) Filed	US_IDS_Form__SB_08a.pdf	656649	no	4
Warnings:					
Information:					
6	NPL Documents	mapreduce_osdi042.pdf	1038285	no	13
Warnings:					
Information:					
7	Fee Worksheet (PTO-875)	fee-info.pdf	8550	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3431330		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 11/539,090

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	200
TOTAL CLAIMS (37 CFR 1.16(i))	46	26	X 25=		OR	X 50=	1,300
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6	3	X 100=			X 200=	600
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			N/A			N/A	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2,900

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/539,090	10/05/2006	2131	2900	YAH1P034/Y01708US0	5	46	6

CONFIRMATION NO. 3099

22434
BEYER WEAVER & THOMAS, LLP
P.O. BOX 70250
OAKLAND, CA94612-0250

FILING RECEIPT

Date Mailed: 01/09/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Ali Dasdan, San Jose, CA;
Hung-Chih Yang, Sunnyvale, CA;
Ruey-Lung Hsiao, Los Angeles, CA;

Assignment For Published Patent Application

YAHOO! INC., Sunnyvale, CA

Power of Attorney: The patent practitioners associated with Customer Number 22434

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 01/08/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/539,090**

Projected Publication Date: 04/10/2008

Non-Publication Request: No

Early Publication Request: No

Title

MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

Preliminary Class

380

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
11/539,090	10/05/2006	2131	2900	YAH1P034/Y01708US0	5	46	6

CONFIRMATION NO. 3099

22434
BEYER WEAVER LLP
P.O. BOX 70250
OAKLAND, CA94612-0250

FILING RECEIPT

Date Mailed: 01/10/2007

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Ali Dasdan, San Jose, CA;
Hung-Chih Yang, Sunnyvale, CA;
Ruey-Lung Hsiao, Los Angeles, CA;

Assignment For Published Patent Application

YAHOO! INC., Sunnyvale, CA

Power of Attorney: The patent practitioners associated with Customer Number 22434

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 01/08/2007

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Projected Publication Date: 04/10/2008

Non-Publication Request: No

Early Publication Request: No

Title

MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

Preliminary Class

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/539,090		2137	2161

Correspondence Address / Fee Address Change

The following fields have been set to Customer Number 76239 on 12/31/2007

- Correspondence Address

The address of record for Customer Number 76239 is:
BEYER WEAVER LLP
P.O. BOX 70250
OAKLAND,CA 94612-0250

PTO/SB/80 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

[X] Practitioners associated with the Customer Number: 77814

OR

[ ] Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

[X] The address associated with Customer Number: 77814

OR

[ ] Firm or Individual Name	Beyer Law Group LLP/Yahoo		
Address			
City		State	Zip
Country			
Telephone		Email	

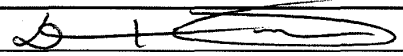
Assignee Name and Address:

Yahoo! Inc.
701 First Avenue
Sunnyvale, CA 94089

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	3/10/2008
Name	Duane Valz	Telephone	408-349-1856
Title	VP & Assoc. General Counsel		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/96 (01-08)
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Dasdan et al.

Application No./Patent No.: 11/539,090 Filed/Issue Date: 11/539,090

Entitled: MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

Yahoo! Inc., a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☑ the assignee of the entire right, title, and interest; or

2. ☐ an assignee of less than the entire right, title and interest
(The extent (by percentage) of its ownership interest is_____ %)

in the patent application/patent identified above by virtue of either:

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 018360, Frame 0513, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.,* a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/ASH/	March 24, 2008
Signature	Date
Alan S. Hodes	408-255-8001
Printed or Typed Name	Telephone Number
Attorney of Record (YAH1P034)	
Title	

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	3038646
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Alan S. Hodes/Laura Dean
Filer Authorized By:	Alan S. Hodes
Attorney Docket Number:	YAH1P034/Y01708US0
Receipt Date:	24-MAR-2008
Filing Date:	05-OCT-2006
Time Stamp:	13:59:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	Yahoo_Signed_Power_of_Attorney.pdf	82053 d2ac97fc7e8ba0172a5eb838eef6428969837b9f	no	1

Warnings:	
Information:	

2	Assignee showing of ownership per 37 CFR 3.73(b).	YAH1P034_373b_Statement.pdf	57418 f017611ce77944f46b8120c5fdf0024cdbe7fa7b	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	139471	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US0

CONFIRMATION NO. 3099

77814
BEYER LAW GROUP LLP/YAHOO
PO BOX 1687
CUPERTINO, CA 95015-1687

POA ACCEPTANCE LETTER

OC000000029152750

Date Mailed: 04/02/2008

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2008.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sareebuddin/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

American Airlines/Hilton, Ex. 1004, p.62
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US0

CONFIRMATION NO. 3099

76239
BEYER WEAVER LLP/Yahoo
P.O. BOX 70250
OAKLAND, CA 94612-0250

POWER OF ATTORNEY NOTICE

OC000000029152678

Date Mailed: 04/02/2008

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/24/2008.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sareebuddin/

Office of Initial Patent Examination (571) 272-4000 or 1-800-PTO-9199

American Airlines/Hilton, Ex. 1004, p.63
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US0

CONFIRMATION NO. 3099

77814
BEYER LAW GROUP LLP/YAHOO
PO BOX 1687
CUPERTINO, CA95015-1687

Title: MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

Publication No. US-2008-0086442-A1
Publication Date: 04/10/2008

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Pre-Grant Publication Division, 703-605-4283

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

77814 7590 12/09/2009

WEAVER AUSTIN VILLENEUVE & SAMPSON LLP - Yahoo
PO BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
MYLES, YOUNFAA O	

ART UNIT	PAPER NUMBER
2434	

NOTIFICATION DATE	DELIVERY MODE
12/09/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@wavsip.com
JoeV@wavsip.com

American Airlines/Hilton, Ex. 1004, p.65
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Office Action Summary	Application No.	Applicant(s)	
	11/539,090	DASDAN ET AL.	
	Examiner	Art Unit	
	YOUNFAA MYLES	2434	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/05/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

American Airlines/Hilton, Ex. 1004, p.66
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

DETAILED ACTION

Claims 1-46 have been examined and are pending.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-23, 39, and 40 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory (or confusing) subject matter.

Claims 1-23 (method claims) seemingly are not tied to a machine.

Independent Claims 39 and 40 (computer system) could be interpreted as software, which does not fall within a 101 statutory class.

Additionally, independent Claim 40 has confusing/dual language for “computer system” and “method of”; the dependent claims follow the latter.

Corrections are warranted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-16, 24-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Publication 2007/0038659 (filed Aug. 15, 2005) to Datar et al., (hereafter "*@Datar*") in view of US Patent 6,158,044 (filed May 20, 1998) to @Tibbetts, (hereafter "*@Tibbetts)*.

As per claim 1, A method of processing data of a data set, wherein the data set comprises a plurality of data groups, the method comprising: for the data of each one

of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group (***@Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);***

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container] specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract));

and reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group (***@Datar paragraph [0059] map function***

may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping (of users)).

As per claim 2, The method of claim 1, wherein: the at least one output data group is a plurality of output data groups (***@Datar paragraph [0060] [system] produces a set [plurality] of output [data groups]***).

As per claim 3, The method of claim 1, wherein: corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group (***@Datar paragraph [0081, 0082] several data structures may be kept, states (idle, in-progress, or completed) and identities may be stored; intermediate [data] may be stored; @Tibbetts column 2 line 1, structural definition (domain relational hierarchy, interaction modes, (references, assumptions)) of [container of objects] components [data groups] may be [represented/identifiable] through metadata***).

As per claim 4, The method of claim 1, wherein: corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group (***@Datar paragraph [0059] [system] model and its library implementation may specify***

function that merges all intermediate values associated with the same intermediate (key) parameter, @Datar paragraph [0061] set of intermediate [groups] may associated with the same intermediate (key) [parameter]).

As per claim 5, The method of claim 1, wherein: processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group (***@Datar paragraph [0062] intermediate values may be supplied [employed] to function through an iterator***).

As per claim 6, The method of claim 1, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs (***@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups]***);

the reducing step is carried out by a plurality of reducers (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***);

the method further comprises: partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions (***@Datar paragraph [0071] reduce invocations may be distributed by partitioning intermediate key space using partitioning function***);

and providing the intermediate data of each partition to a separate one of the reducers (***@Datar paragraph [0071] number of partitions may be [separately] specified, and @Datar paragraph [0090] (constrained for separate output)***).

As per claim 7, The method of claim 1, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs (***@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups]***);

the reducing step is carried out by a plurality of reducers (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***);

the method further comprises: partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers (***@Datar paragraph [0071] number of partitions may be [separately] specified, and @Datar paragraph [0090] (constrained for separate output), @Datar paragraph [0076] (key/value) pairs may be passed to [each] reduce[r]***).

As per claim 8, The method of claim 7, wherein: in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions (***@Datar paragraph [0076] (key/value) pairs may be partitioned into regions by partitioning function –responsibly of which [all] may be [appropriately]forwarded***).

As per claim 9, The method of claim 7, wherein: at least some of the reducers include a sort, group-by-key and combine task (***@Datar paragraph [0077] with reduce worker(s), sorting may be useful; @Datar paragraph [0077] occurrences of same key may be grouped together [group-by-key]; @Datar paragraph [0077] reduce worker may read [combine] all intermediate data, @Datar paragraph [0096] combiner (task/) function may be implemented***);

the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting (***Geiselhart paragraph [0004] (use of meta-information, gathered from derived [mapped, partitioned, combined, grouped, and sorted] information, may provide different ways of seeing authentic information), @Tibbetts column 12 line 6, metadata may describe various data fields of [mapping, partitioning, combining, grouping, sorting,] (etc.) functions and how they relate to one another***).

As per claim 10, The method of claim 9, wherein: the reducing step includes processing the metadata (***@Datar paragraph [0043] reduce routine may processes all the items [e.g., metadata] in interest set***).

As per claim 11, The method of claim 10, wherein: processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step (***@Datar paragraph [0062] [metadata] values may be supplied to reduce function through an iterator***).

As per claim 12, The method of claim 5, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs (***@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups]***);

the reducing step is carried out by a plurality of reducers (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***);

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key than the iterator corresponding to

another particular data group, for that reducer (***@Datar paragraph [0042] reduce routine may be run once for each distinct [different] key***).

As per claim 13, The method of claim 1, wherein: the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data (***@Datar paragraph [0097] reader can read records [directly] from a[n original] database [--that by passes intermediate forms]***).

As per claim 14, The method of claim 13, wherein: the reducing step is carried out by a plurality of reducers (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***);

and the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer (***@Datar paragraph [0097] reader can read records [directly] from data structures [another reducer] mapped in memory [--that by passes intermediate forms]***).

As per claim 15, The method of claim 13, wherein: the reducing step is carried out by a plurality of reducers (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***);

and the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer (***@Datar paragraph [0097] (reduce-)reading input data may be supported in several different formats; @Datar paragraph [0100] each (reduce) worker process may install signal handler … reduce-related library may store [appropriate/reducer-particular] argument in a global (data) variable***).

As per claim 16, A method of relating data among a plurality of data groups, the method comprising: for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group (***@Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);***

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container]

specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract));

and reducing the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the reducing step includes relating the data among the plurality of data groups (***@Datar paragraph [0059] map function may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping (of users)***).

As per claim 24, A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured to: for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group (***@Datar paragraph [0105] [system] and its functional operations may be implemented in computer software, firmware, or hardware; data processing apparatus encompasses all apparatus, devices, and machines***

for processing data; @Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container] specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract);

@Datar paragraph [0059] map function may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping (of users)).

As per claim 25, The computer system of claim 24, wherein: the at least one output data group is a plurality of output data groups (***@Datar paragraph [0060] [system] produces a set [plurality] of output [data groups]***).

As per claim 26, The computer system of claim 24, wherein: corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group (***@Datar paragraph [0081, 0082] several data structures may be kept, states (idle, in-progress, or completed) and identities may be stored; intermediate [data] may be stored; @Tibbetts column 2 line 1, structural definition (domain relational hierarchy, interaction modes, (references, assumptions)) of [container of objects] components [data groups] may be [represented/identifiable] through metadata***).

As per claim 27, The computer system of claim 26, wherein: corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group***@Datar paragraph [0059] [system] model and its library implementation may specify function that merges all intermediate values associated with the same intermediate (key) parameter, @Datar paragraph [0061] set of intermediate [groups] may associated with the same intermediate (key) [parameter]***).

As per claim 28, The computer system of claim 24, wherein: the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group (***@Datar paragraph [0062] intermediate values may be supplied [employed] to function through an iterator***).

As per claim 29, The computer system of claim 24, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs;the computer system includes a plurality of reducers configured to reduce the intermediate data; and the computer system is further configured to: partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and provide the intermediate data of each partition to a separate one of the reducers (***@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups]***; ***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion***; ***@Datar paragraph [0071] reduce invocations may be distributed by partitioning intermediate key space using partitioning function***; ***@Datar paragraph [0071] number of partitions may be [separately] specified, and @Datar paragraph [0090] (constrained for separate output)***).

As per claim 30, The computer system of claim 24, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs;the computer system includes a plurality of reducers configured to reduce the intermediate data; and the computer system is further configured to: partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and provide the intermediate data of each partition to a separate one of the reducers (***@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups], @Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion, @Datar paragraph [0071] number of partitions may be [separately] specified, and @Datar paragraph [0090] (constrained for separate output), @Datar paragraph [0076] (key/value) pairs may be passed to [each] reduce[r]***).

As per claim 31, The computer system of claim 30, wherein: the computer system is configured to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions (***@Datar paragraph [0076] (key/value) pairs may be partitioned into regions by partitioning function –responsibly of which [all] may be [appropriately]forwarded***).

As per claim 32, The computer system of claim 30, wherein: at least some of the reducers include a sort, group-by-key and combine task;the computer system is further

configured to generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting (***@Datar paragraph [0077] with reduce worker(s), sorting may be useful; @Datar paragraph [0077] occurrences of same key may be grouped together [group-by-key]; @Datar paragraph [0077] reduce worker may read [combine] all intermediate data, @Datar paragraph [0096] combiner (task/) function may be implemented, Geiselhart paragraph [0004] (use of meta-information, gathered from derived [mapped, partitioned, combined, grouped, and sorted] information, may provide different ways of seeing authentic information), @Tibbetts column 12 line 6, metadata may describe various data fields of [mapping, partitioning, combining, grouping, sorting,] (etc.) functions and how they relate to one another)***.

As per claim 33, The computer system of claim 32, wherein: the reducing includes processing the metadata (***@Datar paragraph [0043] reduce routine may processes all the items [e.g., metadata] in interest set***).

As per claim 34, The computer system of claim 33, wherein: the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing

(***@Datar paragraph [0062] [metadata] values may be supplied to reduce function through an iterator***).

As per claim 35, The computer system of claim 28, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs;the computer system includes a plurality of reducers;for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key than the iterator corresponding to another particular data group, for that reducer ***(@Datar paragraph [0059] [system] model may specify function that processes key/value pair to generate set [plurality] of intermediate [groups], @Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion, @Datar paragraph [0042] reduce routine may be run once for each distinct [different] key***).

As per claim 36, The computer system of claim 24, wherein: the intermediate data processing of the reducing further comprises processing data that is not intermediate data (***@Datar paragraph [0097] reader can read records [directly] from a[n original] database [--that by passes intermediate forms]***).

As per claim 37, The computer system of claim 36, wherein: the computer system includes a plurality of reducers and the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer (***@Datar***

paragraph [0042] reduce routine may be run in distributed [plurality] fashion);

@Datar paragraph [0097] reader can read records [directly] from data structures

[another reducer] mapped in memory [--that by passes intermediate forms]).

As per claim 38, The computer system of claim 36, wherein: the computer system includes a plurality of reducers and the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer (***@Datar paragraph [0042] reduce routine may be run in distributed [plurality] fashion; @Datar paragraph [0097] (reduce-)reading input data may be supported in several different formats; @Datar paragraph [0100] each (reduce) worker process may install signal handler … reduce-related library may store [appropriate/ reducer-particular] argument in a global (data) variable***).

As per claim 39, A computer system configured to relate data among a plurality of data groups, the computer system configured to: for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and reduce the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the reducing step includes relating the data among the plurality of data groups (***@Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a***

group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container] specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract);

@Datar paragraph [0059] map function may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping (of users)).

Claims 17-23, 40-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over *@Datar* in view of *@Tibbetts*, in further view of US Publication 2004/0225638 (filed Feb. 26, 2004) to Geiselhart et al., (hereafter "*@Geiselhart*").

As per claim 17, A method of configuring a data processing system to process data of a data set, wherein the data set comprises a plurality of data groups, the method comprising (***@Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar***

paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container] specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract)):

for each one of the data groups, configuring the data processing system to include a mapping function that configures the data processing system to map the data of that data group to corresponding intermediate data for that data group, wherein the data processing system ensures that the corresponding intermediate data is identifiable to a data group (***@Datar paragraph [0059] map function may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping (of users)***);

and configuring the data processing system to include at least one reducing function that configures the data processing system to reduce the intermediate data for the data groups to at least one output data group, including to process the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the data processing system provides an iterator corresponding to each of the data groups (***@Datar paragraph [0059] reduce function may merge all intermediate values, @Datar paragraph [0062] intermediate values may be supplied to reduce function through an iterator, however @Datar does not sufficiently teach (relational) defining, however @Geiselhart further teaches (relational) defining (even with further scalability), Geiselhart paragraph [0005] in dealing with high dimensional data, each data or item member may consist of n attributes or features that characterize and specify [define] individual data item in more detail, new methods have been developed to keep the handling of immense data efficient in terms of performance, usage of resources such as scalability of the applied mining technology with increasing number of dimensions [groupings] of underlying data spaces;***

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include (relational) defining as taught by @Geiselhart into the system of @Datar to facilitate analysis for a multitude [groups] of items in a high dimensional (n-dimensional) data space, each described [defined] by n item features (@Geiselhart, Abstract)).

As per claim 18, The method of claim 17, further comprising: configuring group identifications and the corresponding data and functions (***@Tibbetts column 5 line 51, [container of objects] may be introspective in that it "knows" about its own structure, type of [group identifications, data, function-based] contents, how [configuration] contents are arranged, and validation criteria for its contents, @Tibbetts column 5 line 65, [container of objects][configuration] may be changed with change to metadata, @Tibbetts column 9 line 26, adapter may configure specific [container of objects]***).

As per claim 19, The method of claim 17, wherein: the data processing system is such that a partitioning function provides the intermediate data to a plurality of partitions (***@Datar paragraph [0071] reduce invocations may be distributed by partitioning intermediate key space using partitioning function***);

and the method further comprises configuring partitioning modes such that each key/value pair of the intermediate data goes to only one of the partitions or such that at least some of the key/value pairs goes to more than of the partitions (***@Datar paragraph [0041] in map phase, for each (user, item) pair, a (key, value) pair is output with key=user and value=item, in a distributed [partitioned mode] fashion, @Datar paragraph [0071] map invocations may be [selectively] distributed by (automatically) partitioning input data into set of splits, the number of partitions and partitioning function may be specified by user, @Datar paragraph [0088]***

user supplied map and reduce operators may be deterministic functions of their (map and reduce) input values); ***@Tibbetts column 2 line 4, specification [allocation for container of objects], via metadata definitions, may define interaction [partition] modes***).

As per claim 20, The method of claim 17, wherein: the data processing system is operable in one of three reduce modes, a first reduce mode in which the records input to a reduce function through the group iterators carry or share the same key (***@Datar paragraph [0097] MapReduce library may provide support for reading input data in several different formats [modes], for example, "text" mode input treats each line as a key/value pair, @Tibbetts column 10 line 24, [groups of] Iterators may be used for "walking" data or metadata,Geiselhart paragraph [0045] as a course of data pre-processing., mapping can be combined with other common [/shared key] methods***),

a second reduce mode in which the records input to a reduce function through the group iterators need not carry the same key (***@Datar paragraph [0097] [secondly,] another common supported format may store a sequence of key/value pairs sorted by key, each implementation of an input type knows how to split data of its type into meaningful ranges for processing as separate [not of same key] map tasks; … support for a new input type can be added***); and

a third reduce mode in which the records input to a reduce function through the group iterators need not carry the same key and the records input a reduce function may not come from the intermediate data (***@Datar paragraph [0097] [thirdly,] a reader can read records [directly] from a[n original] database or from data structures mapped in memory [--that by passes intermediate forms]***);

and the method further comprises configuring the reduce mode in which the data processing system is operable (***@Tibbetts column 35 line 35, with reducing to a more constrained set, column 9 line 26, adapter tools may be used to configure specific [modes/] templates***).

As per claim 21, The method of claim 17, wherein: the data processing system is operable to include a combining function between the map function and the reduce function (***Geiselhart paragraph [0045] mapping may be combined with data (pre-)processing, @Datar paragraph [0095] [with regard to] map (function) and reduce function, [system] may provide combiner function that merges data***);

and the method further comprises configuring the combining function (***@Datar paragraph [0095] [system] may provide for case where combiner function is [configuratively] specified***).

As per claim 22, The method of claim 17, wherein: the data processing system is operable such that the reducing function includes a sorting capability; the method further comprises configuring the sorting capability of the reducing function (***@Datar paragraph [0077] [after] reduce (function) readings, sorting may occur, @Tibbetts column 8 line 11, data can be saved in any partially-completed form, [capability for] standardized interaction with data via hierarchic navigation [configurability] may come built into system***).

As per claim 23, The method of claim 17, wherein: the data processing system is operable such that the reducing includes a group-by-key and sort functionality and metadata is generated and provided for at least some of the mapping, partitioning, grouping and sorting (***@Datar paragraph [0077] with reduce worker(s), sorting may be useful; @Datar paragraph [0077] occurrences of same key may be grouped together [group-by-key]; @Datar paragraph [0077] reduce worker may read all intermediate data, Geiselhart paragraph [0004] (use of meta-information, gathered from derived [mapped, partitioned, combined, grouped, and sorted] information, may provide different ways of seeing authentic information), @Tibbetts column 12 line 6, metadata may describe various data fields of [mapping, partitioning, combining, grouping, sorting,] (etc.) functions and how they relate to one another***);

and the method further comprises configuring the metadata generation and providing (***@Tibbetts column 11 line 20, [for system] use to adapt to multiple situations, metadata may be used to describe data [whereby] system may "learn" particular application area by absorbing and adding detailed definitions –customization or [configuration] for object introspection may be applied***).

As per claim 40, A computer system of configuring a data processing system to process data of a data set, wherein the data set comprises a plurality of data groups, the method comprising: for each one of the data groups, configuring the data processing system to include a mapping function that configures the data processing system to map the data of that data group to corresponding intermediate data for that data group, wherein the data processing system ensures that the corresponding intermediate data is identifiable to a data group; and configuring the data processing system to include at least one reducing function that configures the data processing system to reduce the intermediate data for the data groups to at least one output data group, including to process the intermediate data for each data group in a manner that is defined to correspond to that data group, wherein the data processing system provides an iterator corresponding to each of the data groups (***@Datar paragraph [0059] [(host) system] implementation of (programming [configuring]) model may process and generate large [plurality] data sets, and @Datar teaches use of data processing system, @Datar paragraph [0006] data processing system may interact with [(host) system], but @Datar does not specifically teach use of***

configuration means, however @Tibbetts teaches use of configuration (tool) means, @Tibbetts Claim 55, data may be organized into a group consisting of (field) groups, @Tibbetts column 37 line 54, [container of objects] can be configured to switch mode (of operations) based on application context (or user input);

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include use of configuration means as taught by @Tibbetts into the system of @Datar to facilitate an architecture system that provides a tool set which allows creation of a set of [object container] specifications (and meta-data) which define structure of possible components [groups] of a proposal [data set] (–which may define hierarchy of domain relationships, and interaction [reduction] modes) features (@Tibbetts, Abstract));

(***@Datar paragraph [0059] map function may processes key/value pair to generate set of intermediate key/value pairs, @Datar paragraph [0052] system may implicitly identify groups items through grouping of users***);

(***@Datar paragraph [0059] reduce function may merge all intermediate values, @Datar paragraph [0062] intermediate values may be supplied to reduce function through an iterator, however @Datar does not sufficiently teach (relational) defining, however @Geiselhart further teaches (relational) defining (even with further scalability), Geiselhart paragraph [0005] in dealing with high dimensional data, each data or item member may consist of n attributes or features that characterize and specify [define] individual data item in more detail,***

new methods have been developed to keep the handling of immense data efficient in terms of performance, usage of resources such as scalability of the applied mining technology with increasing number of dimensions [groupings] of underlying data spaces;

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include (relational) defining as taught by @Geiselhart into the system of @Datar to facilitate analysis for a multitude [groups] of items in a high dimensional (n-dimensional) data space, each described [defined] by n item features (@Geiselhart, Abstract)).

As per claim 41, The method of claim 40, further comprising: configuring group identifications and the corresponding data and functions (***@Tibbetts column 5 line 51, [container of objects] may be introspective in that it "knows" about its own structure, type of [group identifications, data, function-based] contents, how [configuration] contents are arranged, and validation criteria for its contents, @Tibbetts column 5 line 65, [container of objects][configuration] may be changed with change to metadata, @Tibbetts column 9 line 26, adapter may configure specific [container of objects]***).

As per claim 42, The method of claim 40, wherein: the data processing system is such that a partitioning function provides the intermediate data to a plurality of partitions; and the method further comprises configuring partitioning modes such that each

key/value pair of the intermediate data goes to only one of the partitions or such that at least some of the key/value pairs gos to more than of the partitions (***@Datar paragraph [0071] reduce invocations may be distributed by partitioning intermediate key space using partitioning function***; ***@Datar paragraph [0041] in map phase, for each (user, item) pair, a (key, value) pair is output with key=user and value=item, in a distributed [partitioned mode] fashion, @Datar paragraph [0071] map invocations may be [selectively] distributed by (automatically) partitioning input data into set of splits, the number of partitions and partitioning function may be specified by user, @Datar paragraph [0088] user supplied map and reduce operators may be deterministic functions of their (map and reduce) input values***); ***@Tibbetts column 2 line 4, specification [allocation for container of objects], via metadata definitions, may define interaction [partition] modes***).

As per claim 43, The method of claim 40, wherein: the data processing system is operable in one of three reduce modes, a first reduce mode in which the records input to a reduce function through the group iterators carry or share the same key, a second reduce mode in which the records input to a reduce function through the group iterators need not carry the same key; and a third reduce mode in which the records input to a reduce function through the group iterators need not carry the same key and the records input a reduce function may not come from the intermediate data; and the method further comprises configuring the reduce

mode in which the data processing system is operable (***@Datar paragraph [0097] MapReduce library may provide support for reading input data in several different formats [modes], for example, "text" mode input treats each line as a key/value pair, @Tibbetts column 10 line 24, [groups of] Iterators may be used for "walking" data or metadata,Geiselhart paragraph [0045] as a course of data pre-processing., mapping can be combined with other common [/shared key] methods***; ***@Datar paragraph [0097] [secondly,] another common supported format may store a sequence of key/value pairs sorted by key, each implementation of an input type knows how to split data of its type into meaningful ranges for processing as separate [not of same key] map tasks; … support for a new input type can be added***; ***@Datar paragraph [0097] [thirdly,] a reader can read records [directly] from a[n original] database or from data structures mapped in memory [--that by passes intermediate forms]***; ***@Tibbetts column 35 line 35, with reducing to a more constrained set, column 9 line 26, adapter tools may be used to configure specific [modes/] templates***).

As per claim 44, The method of claim 40, wherein: the data processing system is operable to include a combining function between the map function and the reduce function; and the method further comprises configuring the combining function (***Geiselhart paragraph [0045] mapping may be combined with data (pre-)processing, @Datar paragraph [0095] [with regard to] map (function) and reduce function, [system] may provide combiner function that merges data***); (***@Datar***

paragraph [0095] [system] may provide for case where combiner function is [configuratively] specified).

As per claim 45, The method of claim 40, wherein: the data processing system is operable such that the reducing function includes a sorting capability;the method further comprises configuring the sorting capability of the reducing function (***@Datar paragraph [0077] [after] reduce (function) readings, sorting may occur, @Tibbetts column 8 line 11, data can be saved in any partially-completed form, [capability for] standardized interaction with data via hierarchic navigation [configurability] may come built into system***).

As per claim 46, The method of claim 40, wherein: the data processing system is operable such that the reducing includes a group-by-key and sort functionality and metadata is generated and provided for at least some of the mapping, partitioning, grouping and sorting; and the method further comprises configuring the metadata generation and providing (***@Datar paragraph [0077] with reduce worker(s), sorting may be useful; @Datar paragraph [0077] occurrences of same key may be grouped together [group-by-key]; @Datar paragraph [0077] reduce worker may read all intermediate data, Geiselhart paragraph [0004] (use of meta-information, gathered from derived [mapped, partitioned, combined, grouped, and sorted] information, may provide different ways of seeing authentic information), @Tibbetts column 12 line 6, metadata may describe various data fields of***

[mapping, partitioning, combining, grouping, sorting,] (etc.) functions and how they relate to one another; ***@Tibbetts column 11 line 20, [for system] use to adapt to multiple situations, metadata may be used to describe data [whereby] system may "learn" particular application area by absorbing and adding detailed definitions –customization or [configuration] for object introspection may be applied***).

Conclusion

Prior art made of record, not relied upon:

US Patent 6,678,691 (Filed Jul. 3, 2000) directed to Kikkers (Method and System for Generating Corporate Information);

US Publication 2004/0230567 (Filed Oct. 22, 2003) directed to Wookey (Integrating Intellectual Capital into an Intellectual Capital Management System);

US Publication 2007/0255685 (Filed May 1, 2006) directed to Boult et al., (Method and System for Modeling Data); and

US Patent 7,620,936 (Filled Sep. 22, 2005) directed to Ernst et al., (Schema-Oriented Content Management System).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Youn Myles whose telephone number is (571) 270-3358. The examiner can normally be reached 8:00-5:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kambiz Zand can be reached on (571) 272-3811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-3811.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

/YOUNFAA MYLES/

Examiner, Art Unit 2434

11/30/2009

/Michael J Simitoski/

Primary Examiner, Art Unit 2439

Notice of References Cited	Application/Control No. 11/539,090	Applicant(s)/Patent Under Reexamination DASDAN ET AL.	
	Examiner YOUNFAA MYLES	Art Unit 2434	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0038659	02-2007	Datar et al.	707/101
*	B	US-6,158,044	12-2000	Tibbetts, John J.	717/100
*	C	US-2004/0225638	11-2004	Geiselhart et al.	707/001
*	D	US-6,678,691	01-2004	Kikkers, Harald	707/102
*	E	US-2004/0230567	11-2004	Wookey, Michael J.	707/003
*	F	US-2007/0255685	11-2007	Boult et al.	707/002
*	G	US-7,620,936	11-2009	Ernst et al.	717/108
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	YOUNFAA MYLES	2434

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009								
	1	✓								
	2	✓								
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	36	✓								

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	**Art Unit**
	YOUNFAA MYLES	2434

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								
	43	✓								
	44	✓								
	45	✓								
	46	✓								

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	YOUNFAA MYLES	2434

SEARCHED			
Class	Subclass	Date	Examiner
707	1-3	11/30/2009	YM

SEARCH NOTES		
Search Notes	Date	Examiner
Search conducted in East.	11/30/2009	YM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/539,090	10/05/2006 RULE	380	2434	YAH1P034/Y01708US01

APPLICANTS

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Hung-Chih Yang, Sunnyvale, CA;
Ruey-Lung Hsiao, Los Angeles, CA;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

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Foreign Priority claimed	❑ Yes ☑ No	❑ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	❑ Yes ☑ No					
Verified and Acknowledged	/YOUNFAA O MYLES/ Examiner's Signature	Initials	CA	5	46	6

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TITLE

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"7065618"	US-PGPUB	AND	ON	2009/11/30 14:31
L2	5	"7065618"	US-PGPUB; USPAT	AND	ON	2009/11/30 14:31
S1	5	"7065618"	US-PGPUB; USPAT	AND	OFF	2009/10/15 13:32
S2	16	dasdan-ali.in.	US-PGPUB; USPAT	AND	OFF	2009/10/15 13:51
S3	7	yang-hung.in.	US-PGPUB; USPAT	AND	OFF	2009/10/15 14:28
S4	8	yang-hung-chih.in.	US-PGPUB; USPAT	AND	OFF	2009/10/15 14:29
S5	7	"6678691"	US-PGPUB; USPAT	AND	OFF	2009/11/18 10:36
S6	0	@AD<"20061005" (key NEAR3 value).ab. (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within))	USPAT	AND	OFF	2009/11/18 13:15
S7	42	@AD<"20061005" (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within))	USPAT	AND	OFF	2009/11/18 13:15
S8	0	@AD<"20061005" (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT (print OR printhead)	USPAT	AND	OFF	2009/11/18 13:17

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S9	19	@AD<"20061005" (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead	USPAT	AND	ON	2009/11/18 13:17
S10	17	@AD<"20061005" (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 13:18
S11	17	@AD<"20061005" (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:33
S12	56	@AD<"20061005" (key NEAR3 value) map function ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:39
S13	2	@AD<"20061005" (key NEAR3 value) map function intermediate metadata ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:40
S14	1	@AD<"20061005" (key NEAR3 value) map function intermediate metadata (reduc$ OR contract OR pare OR deflate OR "scale down" OR taper) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:41
S15	194	@AD<"20061005" (key NEAR3 value) map function intermediate metadata (reduc$ OR contract OR pare OR deflate OR "scale down" OR taper) ((itera$5 OR count$5) (different OR differs OR alternate) (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:44

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S16	194	@AD<"20061005" (key NEAR3 value) map function metadata intermediate (reduc$ OR contract OR pare OR deflate OR "scale down" OR taper) ((itera$5 OR count$5) (different OR differs OR alternate) (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:45
S17	24	@AD<"20061005" (key NEAR3 value) map function metadata intermediate WITH (reduc$ OR contract OR pare OR deflate OR "scale down" OR taper) ((itera$5 OR count$5) (different OR differs OR alternate) (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	ON	2009/11/18 14:45
S18	0	@AD<"20061005" set groups (key NEAR3 value) map function metadata intermediate WITH (reduc$ OR contract OR pare OR deflate OR "scale down" OR taper) ((itera$5 OR count$5).ab. (different OR differs OR alternate) (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	OFF	2009/11/18 14:52
S19	1	@AD<"20061005" set groups (key NEAR3 value) map function metadata intermediate WITH (reduc$) ((itera$5 OR count$5) (different OR differs OR alternate) (inside OR within)) NOT printhead NOT Ginter	USPAT	AND	OFF	2009/11/18 14:53
S20	273	@AD<"20061005" (key NEAR4 value) (itera$5 OR count$5 OR cycle) input metadata (intermediate OR stage) (aggregate OR partit$ OR combine) (index OR sort)	USPAT	AND	OFF	2009/11/19 16:02
S21	4	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5 OR count$5 OR cycle) input metadata (intermediate OR stage) (aggregate OR partit$ OR combine) (index OR sort)	USPAT	AND	OFF	2009/11/19 16:04
S22	0	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5) input metadata (intermediate OR stag$) (aggregate OR partit$ OR combine) (index OR sort)	USPAT	AND	OFF	2009/11/19 16:08

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S23	0	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5) input metadata (intermediate OR stag$)	USPAT	AND	OFF	2009/11/19 16:09
S24	2	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5) input metadata (intermediate OR stage)	USPAT	AND	ON	2009/11/19 16:09
S25	2	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5) input meta ADJ2 data (intermediate OR stage)	USPAT	AND	ON	2009/11/19 16:12
S26	1	@AD<"20061005" "data processing".ab. (key NEAR4 value) (itera$5) input meta ADJ2 data reduce	USPAT	AND	ON	2009/11/19 16:14
S27	14	@AD<"20061005" "data processing".ab. (key NEAR4 value) meta reduce	USPAT	AND	ON	2009/11/19 16:16
S28	5	@AD<"20061005" "data processing".ab. (key NEAR4 value) meta intermediate	USPAT	AND	ON	2009/11/19 16:21
S29	14	@AD<"20061005" "data processing".ab. (key NEAR4 value) meta intermediate	US-PGPUB	AND	ON	2009/11/19 16:22
S30	12	@AD<"20061005" "data processing".ab. (key NEAR4 value) meta intermediate mapping	US-PGPUB	AND	ON	2009/11/19 16:25
S31	6	@AD<"20061005" "data process $".ab. (key NEAR4 value) meta intermediate mapping	US-PGPUB	AND	ON	2009/11/19 16:25
S32	0	@AD<"20061005" "data process $".ti. (key NEAR4 value) meta intermediate mapping NOT printer	US-PGPUB	AND	ON	2009/11/19 16:26
S33	0	@AD<"20061005" "data process $".ti. (key value) meta intermediate mapping NOT printer	US-PGPUB	AND	ON	2009/11/19 16:26
S34	445	@AD<"20061005" data NEAR4 processing (key value) meta intermediate mapping NOT printer	US-PGPUB	AND	ON	2009/11/19 16:27
S35	32	S34 (reducer OR Contractor OR deflate OR pare OR "scale down" OR taper OR shrink)	US-PGPUB	AND	ON	2009/11/19 16:29

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S36	0	@AD<"20061005" "data processing".ab. 707./1.ccls. meta intermediate	US-PGPUB	AND	ON	2009/11/19 16:36
S37	0	@AD<"20061005" "data processing".ab. 707/1.ccls. meta intermediate	US-PGPUB	AND	ON	2009/11/19 16:36
S38	3	@AD<"20061005" "data processing".ab. 707/3.ccls. meta intermediate	US-PGPUB	AND	ON	2009/11/19 16:37
S39	71	@AD<"20061005" "data processing" 707/1-3.ccls. meta transform	US-PGPUB	AND	ON	2009/11/19 16:38
S40	94	@AD<"20061005" "data processing" 707/1-3.ccls. meta mapping	US-PGPUB	AND	ON	2009/11/19 16:53
S41	11	@AD<"20061005" "data processing" 707/1-3.ccls. meta mapping matrix	US-PGPUB	AND	ON	2009/11/19 17:13
S42	262	@AD<"20061005" (key NEAR4 value) (iter54pa$5 OR count$5 OR cycle) input metadata (intermediate OR stage) (aggregate OR partit$ OR combine) (index OR sort)	USPAT	AND	OFF	2009/11/23 16:00
S43	0	@AD<"20061005" mapReduce (key NEAR4 value) iterators input metadata (intermediate OR stage)	USPAT	AND	OFF	2009/11/23 16:02
S44	0	@AD<"20061005" mapReduce iterators input metadata (intermediate)	USPAT	AND	OFF	2009/11/23 16:02
S45	0	@AD<"20061005" mapReduce iterators	US-PGPUB; USPAT	AND	OFF	2009/11/23 16:03
S46	8	@AD<"20061005" mapReduce	US-PGPUB; USPAT	AND	OFF	2009/11/23 16:03
S47	8	@AD<"20061005" mapReduce	US-PGPUB; USPAT	AND	OFF	2009/11/23 16:06
S48	0	@AD<"20061005" yahoo.as. (key NEAR3 value) (map WITH function) ((itera$5 OR count$5) WITH (different OR differs OR alternate) SAME (inside OR within))	US-PGPUB; USPAT	AND	OFF	2009/11/30 14:09
S49	2	@AD<"20061005" yahoo.as. (key NEAR3 value) map iterat$	US-PGPUB; USPAT	AND	OFF	2009/11/30 14:10

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11539090 - GAU: 2434

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	
	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Receipt date: 10/05/2006	Application Number	11539090 - GAU: 2434
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

/Y.M./	1	Jeffrey Dean and Sanjay Ghemawat, "MapReduce: Simplified Data Processing on Large Clusters", USENIX Association OSDI '04: 6th Symposium on Operating Systems Design and Implementation, December 6-8 2004, pp137-149.	☐

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Sir:

The assignee of the entire interest in the patents and patent applications listed on the attached Appendix A hereby revokes all powers of attorney previously given and hereby appoints the law firm of Weaver Austin Villeneuve & Sampson LLP and all practitioners who are associated with the **Customer Number 76239** as principal attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Pursuant to 37 CFR §3.71, the assignee is of record as shown and is owner of the entire right, title and interest in patents and patent applications listed on Appendix A. Assignee hereby states that prosecution of the patent application shall be conducted to the exclusion of the inventive entity or any assignee previously entitled to conduct prosecution.

Pursuant to 37 CFR §3.73, Yahoo! Inc. is the assignee of the patents and patent applications listed by virtue of the Assignment information indicated on Appendix A. Assignee hereby states that prosecution of the patent application shall be conducted to the exclusion of the inventive entity or any assignee previously entitled to conduct prosecution.

I am authorized to act on behalf of the assignee.

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American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Please send all correspondence for this application as follows:

Customer Number 76239
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Assignee of Entire Interest: Yahoo! Inc.
701 First Avenue
Sunnyvale, CA 94089

Date 12/16/2009

By: [signature]
PrintedName: Jeanine L. Hayes
Title: VP, Legal - Global IP

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American Airlines/Hilton v. R2 Solutions
IPR2023-00689

APPENDIX A

SERIAL	FILE	PATENT	REEL & FRAME	
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APPENDIX A

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APPENDIX A

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APPENDIX A

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Electronic Acknowledgement Receipt

EFS ID:	6806745
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Joseph Michael Villeneuve/emma durrell
Filer Authorized By:	Joseph Michael Villeneuve
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	13-JAN-2010
Filing Date:	05-OCT-2006
Time Stamp:	19:56:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	BLG_YAHOO_SIGNED_POA.pdf	204152 ca53211aaf73cccb79df788b41df6469e241d2d1	no	8

Warnings:	
Information:	

Total Files Size (in bytes):	204152

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/539,090		2434	2161

OC000000039864247

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 76239 on 01/13/2010

- **Correspondence Address**
- **Power of Attorney Address**

The address of record for Customer Number 76239 is:

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American Airlines/Hilton v. R2 Solutions
IPR2023-00689

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01

CONFIRMATION NO. 3099

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POA ACCEPTANCE LETTER

OC000000039786079

Date Mailed: 01/26/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/13/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sibrahim/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

American Airlines/Hilton, Ex. 1004, p.126
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01

CONFIRMATION NO. 3099

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OAKLAND, CA 94612-0250

POWER OF ATTORNEY NOTICE

OC000000039786024

Date Mailed: 01/26/2010

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/13/2010.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/sibrahim/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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American Airlines/Hilton v. R2 Solutions
IPR2023-00689

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Younfaa O. Myles
Filed: October 5, 2006	Group: 2434
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on March 9, 2010.

Signed: /Valerie Padgett/
Typed: Valerie Padgett

AMENDMENT A

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Office Action dated 9 December 2009, a response to which is due on 9 March 2010.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 13 of this paper.

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CURRENTLY AMENDED) A method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group; and

reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group.

2. (Original) The method of claim 1, wherein:

the at least one output data group is a plurality of output data groups.

3. (Original) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

4. (Original) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group.

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5. (Original) The method of claim 1, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group.

6. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

7. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

8. (Original) The method of claim 7, wherein:

in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions.

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9. (Original) The method of claim 7, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

10. (Original) The method of claim 9, wherein:

the reducing step includes processing the metadata.

11. (Original) The method of claim 10, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step.

12. (CURRENTLY AMENDED) The method of claim 5, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

13. (Original) The method of claim 1, wherein:

the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data.

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14. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

15. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

16. (CURRENTLY AMENDED) [[A]] The method of claim 1 ~~of relating data among a plurality of data groups, the method comprising:~~

~~for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and~~

~~reducing the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group,~~ wherein the reducing step includes relating the data among the plurality of data groups.

17-23. (CANCELLED)

24. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured to:

for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first

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data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group; and

reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group.

25. (Original) The computer system of claim 24, wherein:

the at least one output data group is a plurality of output data groups.

26. (Original) The computer system of claim 24, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

27. (Original) The computer system of claim 26, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group.

28. (Original) The computer system of claim 24, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group.

29. (Original) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

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the computer system includes a plurality of reducers configured to reduce the intermediate data; and

the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

30. (Original) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers configured to reduce the intermediate data; and

the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

31. (Original) The computer system of claim 30, wherein:

the computer system is configured to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions.

32. (Original) The computer system of claim 30, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the computer system is further configured to

generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

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33. (Original) The computer system of claim 32, wherein:

the reducing includes processing the metadata.

34. (Original) The computer system of claim 33, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing.

35. (CURRENTLY AMENDED) The computer system of claim 28, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

36. (Original) The computer system of claim 24, wherein:

the intermediate data processing of the reducing further comprises processing data that is not intermediate data.

37. (Original) The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

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38. (Original) The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

39. (CURRENTLY AMENDED) [[A]] The computer system of claim 24, ~~configured to relate data among a plurality of data groups, the computer system configured to:~~

~~for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group; and~~

~~reduce the intermediate data for the data groups to at lease one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group,~~ wherein the computer system is further configured to reduce by ~~the reducing step includes~~ relating the data among the plurality of data groups.

40-46. (CANCELLED)

47. (NEW) A map-reduce method of processing data from a plurality of groups having different schema over a computer system, the method comprising:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set, wherein the first schema differs from the second schema; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second

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intermediate data set, and the output data set has a different schema than the first and second schema.

48. (NEW) The map-reduce method of claim 47, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

49. (NEW) The map-reduce method of claim 47, wherein the reducing is accomplished by a plurality of reducers, the method further comprises:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

50. (NEW) The map-reduce method of claim 49, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

51. (NEW) The map-reduce method of claim 49, wherein at least some of the reducers include a sort, group-by-key and combine task, the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

52. (NEW) The map-reduce method of claim 51, wherein the reducing includes processing the metadata.

53. (NEW) The map-reduce method of claim 52, wherein iterating includes providing the associated metadata to the processing of the reducing step.

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54. (NEW) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured for:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set, wherein the first schema differs from the second schema; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema.

55. (NEW) The computer system of claim 54, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

56. (NEW) The computer system of claim 54, wherein the reducing is accomplished by a plurality of reducers, the computer system further configured for:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

57. (NEW) The computer system of claim 56, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

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58. (NEW) The computer system of claim 56, wherein at least some of the reducers include a sort, group-by-key and combine task, the computer system further configured for:

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

59. (NEW) The computer system of claim 58, wherein the reducing includes processing the metadata.

60. (NEW) The computer system of claim 59, wherein iterating includes providing the associated metadata to the processing of the reducing step.

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REMARKS

Claims 1, 12, 16, 24, 35, and 39 have been amended and claims 17-23 and 40-46 have been cancelled. No new matter is introduced by the amendments of these claims. New claims 47-60 have been added. Accordingly, claims 1-16, 24-39 and 47-60 remain pending.

The amendments are presented herein so as to expedite prosecution, and the original or any other claim scope is not conceded. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution.

Claims 1-23, 39, and 40 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. The Examiner states that claims 1-23 (method claims) are seemingly not tied to a machine. Claim 1 has been amended to tie the method to a distributed system. Additionally, the Examiner states that claim 39 and 40 (computer system) could be interpreted as software, which currently does not fall within a 101 statutory class. Claim 40 has been cancelled. Claim 39 has been amended and tied to the computer system including a plurality of computing devices as recited in claim 1. Since claims 1-23 are now tied to a distributed system and claim 39 is tied to a computer system, it is respectfully submitted that claims 1-11 meet the requirements of 35 U.S.C. §101.

The Examiner rejected claim 1-16 and 24-39 under 35 U.S.C. §103(a) as being unpatentable over Datar et al. (U.S. Publication No. 2007/0038659) in view of Tibbetts (US Patent No. 6,158,044). Additionally, claims 17-23 and 40-46 are rejected under 35 U.S.C. §103(a) as being unpatentable over Datar in view of Tibbetts, in further view of Geiselhart (U.S. Publication No. 2004/0225638). The Examiner's rejections are respectfully traversed as follows.

Claim 1 is directed towards a "method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups." Claim 1 recites "for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group" and that "the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group." Claim 1 further recites "reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group." Claim 24 is directed towards an apparatus for performing similar operations.

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New claim 47 is directed towards a "map-reduce method of processing data from a plurality of groups having different schema over a computer system." Claim 47 also recites "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set" and "for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set, wherein the first schema differs from the second schema." Claim 47 also recites "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema." Claim 54 is directed towards an apparatus for performing similar operations.

The primary reference Datar is directed towards user clustering, as well as map-reduce techniques. See Fig. 2 and Paragraph [0033]. However, Datar appears to disclose using a mapping technique for a specific, single type of input schema. For example, Datar discloses a map phase in which "for each (user, item) pair, a (key, value) pair is output with key=user and value=item, in distributed fashion." See Paragraph [0041]. That is, each distributed map phase is assumed to process the same schema of "user, item." Datar also describes mapping document log data to word and count schema. See Paragraph [0064]. Since Datar only appears to disclose distributed mapping for a single schema, it is respectfully submitted that Datar fails to teach or suggest techniques or apparatus for mapping data sets having different schema to intermediate data and reducing such intermediate data sets (mapped from different schema) to produce an output data set, as recited in the independent claims. Additionally, Datar fails to teach or suggest apparatus or methods for reducing by iterating at least one key of a first and second intermediate data set to an output set that has a different schema than the first and second data sets, which were input to different mapping functions, in the manner claimed in claims 47 and 54. The secondary references fail to overcome these deficiencies.

The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-16, 25-39, and 48-60 each depend directly or indirectly from independent claims 1, 24, 47, or 54 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 24, 47, or 54. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art. For example, claim 12 recites "for at least one of the reducers, the iterator

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corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer." Since the cited art appears to merely teach techniques or apparatus that use reducers that operate on data having a single schema as produced by the above described mapping function, the cited art also necessarily fails to disclose reducers that operate according to different keys of different schema, in the manner claimed

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. If the Examiner believes that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number listed at the bottom of this page.

Applicants hereby petition for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this amendment is to be charged to Deposit Account No. 504480 (Order No. YAH1P034).

Respectfully submitted,
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Electronic Acknowledgement Receipt

EFS ID:	7173760
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick/Valerie Padgett
Filer Authorized By:	Mary Ramos Olynick
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	09-MAR-2010
Filing Date:	05-OCT-2006
Time Stamp:	17:22:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		YAH1P034_Amd_A.pdf	61524 884fb6d3cd0381218dfea65ccd1298b29e8228d5	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	12
	Applicant Arguments/Remarks Made in an Amendment	13	15
Warnings:			
Information:			
	Total Files Size (in bytes):	61524	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/539,090	Filing Date 10/05/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	03/09/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 46	Minus	** 46	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***6	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/BRENDA HARRISON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

76239 7590 08/17/2010

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OAKLAND, CA 94612-0250

EXAMINER	
TABOR, AMARE F	
ART UNIT	PAPER NUMBER
2434	

NOTIFICATION DATE	DELIVERY MODE
08/17/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@wavsip.com

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IPR2023-00689

Office Action Summary	Application No.	Applicant(s)	
	11/539,090	DASDAN ET AL.	
	Examiner	Art Unit	
	AMARE TABOR	2434	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,24-39 and 47-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,24-39 and 47-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

1. This is in response to **Amendments** and **REMARKS** filed on March 09, 2010.

2. Claims 1, 12, 16, 35 and 39 are amended; claims 17-23 and claims 40-46 are cancelled; and claims 47-60 are newly added.

3. **Claims 1-16, 24-39 and 47-60** are pending.

Response to Arguments

4. In response to 35 U.S.C. 101 rejection of independent claims 1-23 (not tied to a machine), applicant responded by adding the phrases "over a distributed system" to the preamble of the claim. However, the rejection is not withdrawn, because the steps of the method claim are not still tied to a machine.

5. Applicant's arguments with respect to prior art rejection of the pending claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

- **Claims 1 and 47** are rejected under 35 U.S.C. 101 based on Supreme Court precedent and recent Federal Circuit decisions, a 35 U.S.C § 101 process must (1) be tied to a particular machine or (2) transform underlying subject matter (such as an article or materials) to a different state or thing.

In re Bilski et al, 88 USPQ 2d 1385 CAFC (2008); Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584, 588 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780,787-88 (1876).

An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a § 101 statutory process, the claim should positively recite the particular machine to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

Here, applicant's method steps are not tied to a particular machine and do not perform a transformation. Thus, the claims are non-statutory.

The mere recitation of the machine in the preamble with an absence of a machine in the body of the claim fails to make the claim statutory under 35 USC 101.

Note the Board of Patent Appeals Informative Opinion Ex parte Langemyer et al.

- **Claims 2-16 and 47-53** are rejected under 35 U.S.C. 101 at least for their dependency on independent claims 1 and 47 respectively.

35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-16, 24-39 and 47-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Datar et al. (US, 2007/0038659 A1, hereafter "**Datar**") in view of Borroughs et al. (US 6,341,289 B1, hereafter "**Borroughs**")

As per Claim 1, Datar teaches:

A method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising: for the data of each one of the data groups,

mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group [see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059], and reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group [see 'Reduce phase:…222' in FIG.2; and for example, par.0052 and 0059].

Datar is silent about "wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group". However, in the same field of endeavor, **Borroughs** teaches "wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group" [see 'RDBS & OO schema' in FIGS.1-2; and for example, col.5, lines 37-50]. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of applicant's invention was made to modify the system of **Datar** by incorporating the flexible schema teaching of **Borroughs**. An artisan would be motivated to modify in order to facilitate flexible schema mapping [see at least abstract of **Borroughs**].

As per Claim 24, Datar-Borroughs combination teaches:

A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured to: for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group [see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059 of **Datar**], wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group [see FIGS.1-2; and for example, col.5, lines 37-50 of **Borroughs**]; and reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group

[see 'Reduce phase:…222' in FIG.2; and for example, par.0052 and 0059 of **Datar**].

As per Claim 47, Datar teaches:

A map-reduce method of processing data from a plurality of groups having different schema over a computer system, the method comprising: for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema [see for example, par.0041-0042, 0059 and 0061-0062 of **Datar**], mapping the first data set to a first intermediate data set [see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059 of **Datar**]; for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema [see for example, par.0041-0042, 0059 and 0061-0062 of **Datar**], mapping the second data set to a second intermediate data set[see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059 of **Datar**]; and reducing the first and the second intermediate data set together so as to form an output data set [see 'Reduce phase:…222' in FIG.2; and for example, par.0052 and 0059 of **Datar**], wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set [see par.0062 of **Datar**].

Datar teaches schema and reducing; but is silent about the first schema differs from the second schema and the output data set has a different schema than the first and second schema. However, **Borroughs** teaches using different schema [see FIGS.1-2; and for example, col.5, lines 37-50]. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of applicant's invention was made to modify the system of **Datar** by incorporating the flexible schema teaching of **Borroughs**. An artisan would be motivated to modify in order to facilitate flexible schema mapping [see at least abstract of **Borroughs**].

As per Claim 54, Datar-Borroughs combination teaches:

A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer

system configured for: for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema [see for example, par.0041-0042, 0059 and 0061-0062 of **Datar**], mapping the first data set to a first intermediate data set [see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059 of **Datar**]; for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema [see for example, par.0041-0042, 0059 and 0061-0062 of **Datar**], mapping the second data set to a second intermediate data set [see 'Map phase:…220' in FIG.2; for example, par.0006 and 0059 of **Datar**], wherein the first schema differs from the second schema [see FIGS.1-2; and for example, col.5, lines 37-50 of **Borroughs**]; and reducing the first and the second intermediate data set together so as to form an output data set [see 'Reduce phase:…222' in FIG.2; and for example, par.0052 and 0059 of **Datar**] , wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set [see par.0062 of **Datar**], and the output data set has a different schema than the first and second schema [see FIGS.1-2; and for example, col.5, lines 37-50 of **Borroughs**].

As per Claim 2, Datar-Borroughs combination teaches:

The method of claim 1, wherein: the at least one output data group is a plurality of output data groups [see for example, par.0060 of **Datar**].

Claim 25 is rejected for the same reasons applied to reject claim 2.

As per Claims 3-4, Datar-Borroughs combination teaches:

The method of claim 1, wherein: corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group [see for example, par.0080-0081 of **Datar**]; and wherein: corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group [see for example, par.0059 and 0061 of **Datar**].

Claims 26-27 are rejected for the same reasons applied to reject claims 3-4.

As per Claim 5, Datar-Borroughs combination teaches:

The method of claim 1, wherein: processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group [see for example, par.0062 of **Datar**].

Claim 28 is rejected for the same reasons applied to reject claim 5.

As per Claim 6, Datar-Borroughs combination teaches:

The method of claim 1, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs [see for example, par.0059 of **Datar**]; the reducing step is carried out by a plurality of reducers [see for example, par.0042 of **Datar**]; the method further comprises: partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions [see for example, par.0071 of **Datar**]; and providing the intermediate data of each partition to a separate one of the reducers [see for example, par.0071 and 0090 of **Datar**].

Claims 29, 49 and 56 are rejected for the same reasons applied to reject claim 6.

As per Claim 7, Datar-Borroughs combination teaches:

The method of claim 1, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs [see for example, par.0059 of **Datar**]; the reducing step is carried out by a plurality of reducers [see for example, par.0042 of **Datar**]; the method further comprises: partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers [see for example, par.0071, 0076 and 0090 of **Datar**].

Claim 30 is rejected for the same reasons applied to reject claim 7.

As per Claim 8, Datar-Borroughs combination teaches:

The method of claim 7, wherein: in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions [see for example, par.0076 of **Datar**].

Claim 31 is rejected for the same reasons applied to reject claim 8.

As per Claim 9, Datar-Borroughs combination teaches:

The method of claim 7, wherein: at least some of the reducers include a sort, group-by-key and combine task; the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting [see for example, par.0004, 0077 and 0096 of **Datar**].

Claims 32, 51 and 58 are rejected for the same reasons applied to reject claim 9.

As per Claim 10, Datar-Borroughs combination teaches:

The method of claim 9, wherein: the reducing step includes processing the metadata [see for example, par.0043 of **Datar**].

Claims 33, 52 and 59 are rejected for the same reasons applied to reject claim 33.

As per Claim 11, Datar-Borroughs combination teaches:

The method of claim 10, wherein: processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step [see for example, par.0062 of **Datar**].

Claims 34, 53 and 60 are rejected for the same reasons applied to reject claim 11.

As per Claim 12, Datar-Borroughs combination teaches:

The method of claim 5, wherein: the intermediate data includes a plurality of grouped sets of key/value pairs [see for example, par.0059 of **Datar**]; the reducing step is carried out by a plurality of reducers [see for example, par.0042 of **Datar**]; for at least one of the reducers, the iterator corresponding

to a particular data group, for that reducer [see for example, par.0062 of **Datar**. See also col.12, lines 33-49 of **Borroughs**], operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer [see FIGS.1-2; and for example, col.5, lines 37-50 of **Borroughs**].

Claim 35 is rejected for the same reasons applied to reject claim 12.

As per Claim 13, Datar-Borroughs combination teaches:

The method of claim 1, wherein: the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data [see for example, par.0097 of **Datar**].

Claim 36 is rejected for the same reasons applied to reject claim 13.

As per Claim 14, Datar-Borroughs combination teaches:

The method of claim 13, wherein: the reducing step is carried out by a plurality of reducers [see for example, par.0042 of **Datar**]; and the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer [see for example, par.0097 of **Datar**].

Claim 37 is rejected for the same reasons applied to reject claim 14.

As per Claim 15, Datar-Borroughs combination teaches:

The method of claim 13, wherein: the reducing step is carried out by a plurality of reducers [see for example, par.0042 of **Datar**]; and the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer [see for example, par.0097 and 0100 of **Datar**].

Claim 38 is rejected for the same reasons applied to reject claim 15.

As per Claim 16, Datar-Borroughs combination teaches:

The method of claim 1 wherein the reducing step includes relating the data among the plurality of data groups [see for example, par.0042 of **Datar**].

Claim 39 is rejected for the same reasons applied to reject claim 16.

As per Claim 48, Datar-Borroughs combination teaches:

The map-reduce method of claim 47, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set [see for example, par.0062 of **Datar**. See also col.12, lines 33-49 of **Borroughs**].

Claim 55 is rejected for the same reason applied to reject claim 48.

As per Claim 50, Datar-Borroughs combination teaches:

The map-reduce method of claim 49, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers [see for example, par.0042 of **Datar**].

Claim 57 is rejected for the same reasons applied to reject claim 50.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **AMARE TABOR** whose telephone number is (571)270-3155. The examiner can normally be reached on Mon-Fri 8:00a.m. to 5:00p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **KAMBIZ ZAND** can be reached on (571) 272-3811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Amare Tabor/
Examiner, Art Unit 2434

/Farid Homayounmehr/
Primary Examiner, Art Unit: 2434

Notice of References Cited	Application/Control No. 11/539,090	Applicant(s)/Patent Under Reexamination DASDAN ET AL.	
	Examiner AMARE TABOR	Art Unit 2434	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,341,289	01-2002	Burroughs et al.	707/737
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	AMARE TABOR	2434

SEARCHED			
Class	Subclass	Date	Examiner
707	1-3	11/30/2009	YM

SEARCH NOTES		
Search Notes	Date	Examiner
Search conducted in East.	11/30/2009	YM
Class/sub-class {707} and KEYWORD search is updated	08/11/2010	aft
Consulted Hosain Alan (2166, SPE) and Khan Pham (PE, 2166]	08/11/2010	aft

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	AMARE TABOR	2434

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
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	33	✓	✓							
	34	✓	✓							
	35	✓	✓							
	36	✓	✓							

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	AMARE TABOR	2434

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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	60		✓							

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	11/539090	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 16:13
S2	28	(Dasdan-Ali Yang-Hung-Chih Hsiao-Ruey-Lung).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 16:14
S3	3	S2 and ((map$4 and reduc $3) with data with group).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 16:15
S4	2	"7523123".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 16:17
S5	2	("6678691" | "7065618").PN. OR ("7523123").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 16:17
S6	2150	(Yahoo! yahoo yahoo-$).as.	US-PGPUB; USPAT; USOCR	OR	ON	2010/08/04 16:18
S7	3	S6 and ((map$4 and reduc $3) with data with group).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 16:18
S8	3	S7 and key	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 17:03

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S9	2	"7065618".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 17:13
S10	2359	380/277.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:01
S11	195	S10 and (map$4 with key)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:01
S12	54	S11 and (map$4 with key with (set group pair))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:02
S13	18	S12 and ((map$4 with key with (set group pair)).ti. (map$4 with key with (set group pair)).ab. (map $4 with key with (set group pair)).clm.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:02
S14	41	S12 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:03
S15	14	S13 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:04
S16	324	((map$4 with key with (set group pair)).ti. (map $4 with key with (set group pair)).ab.) not S10 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:06

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S17	10	S16 and ((map$4 with key with (set group pair) with reduc$3).ti. (map$4 with key with (set group pair) with reduc$3).ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/04 18:07
S18	169	(schema adj map$4).ab. (schema adj map$4).ti. and "707"/$.ccls. and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:10
S19	0	S18 and (((key index) with (set group pair)).ti. ((key index) with (set group pair)).ab.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:11
S20	21	S18 and ((key index) with (set group pair))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:12
S21	17	S20 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:17
S22	13	(schema adj map$4) same ((key index) with (set group pair))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:20
S23	11	S22 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:20
S24	6	("6341289" "5956725" "5893108").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:28

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S25	1	11/539090	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:29
S26	1	S25 and (key$1pair (key with pair))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:29
S27	66	MapReduce	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:30
S28	18	MapReduce and (key $1pair (key with pair))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:31
S29	4	S28 and @ad<"20061005"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/11 15:31
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EAST Search History (Interference)

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Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/539,090	Filing Date	2006-05-10	Docket Number (if applicable)	YAH1P034/701708US01	Art Unit	3099
First Named Inventor	ALI DASDAN			Examiner Name	AMARE F. TABOR		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 504480

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

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PTO/SB/30EFS (07-09)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Signature of Registered U.S. Patent Practitioner			
Signature	/Mary R. Olynick/	Date (YYYY-MM-DD)	2010-11-17
Name	Mary R. Olynick	Registration Number	42963

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Amaref F. Tabor
Filed: October 5, 2006	Group: 2434
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on November 17, 2010.

Signed: /Valerie Padgett/
Typed: Valerie Padgett

AMENDMENT B (RCE FILED HEREWITH)

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Final Office Action dated 17 August 2010, a response to which is due on 17 November 2010.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 13 of this paper.

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CURRENTLY AMENDED) A method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group, wherein the different schema have a key in common; and

reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group,

wherein the mapping and reducing operations are performed by a distributed system.

2. (Original) The method of claim 1, wherein:

the at least one output data group is a plurality of output data groups.

3. (Original) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

4. (Original) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group.

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5. (Original) The method of claim 1, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group.

6. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

7. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

8. (Original) The method of claim 7, wherein:

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in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions.

9. (Original) The method of claim 7, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

10. (Original) The method of claim 9, wherein:

the reducing step includes processing the metadata.

11. (Original) The method of claim 10, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step.

12. (Previously presented) The method of claim 5, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

13. (Original) The method of claim 1, wherein:

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the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data.

14. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

15. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

16. (Previously presented) The method of claim 1 wherein the reducing step includes relating the data among the plurality of data groups.

17-23. (CANCELLED)

24. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured to:

for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group, wherein the different schema have a key in common; and

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reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group.

25. (Original) The computer system of claim 24, wherein:

the at least one output data group is a plurality of output data groups.

26. (Original) The computer system of claim 24, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

27. (Original) The computer system of claim 26, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group.

28. (Original) The computer system of claim 24, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group.

29. (Original) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers configured to reduce the intermediate data; and

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the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

30. (Original) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers configured to reduce the intermediate data; and

the computer system is further configured to:

partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

31. (Original) The computer system of claim 30, wherein:

the computer system is configured to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions.

32. (Original) The computer system of claim 30, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the computer system is further configured to

generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

33. (Original) The computer system of claim 32, wherein:

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the reducing includes processing the metadata.

34. (Original) The computer system of claim 33, wherein:

the computer system being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the computer system being configured to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing.

35. (Previously presented) The computer system of claim 28, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the computer system includes a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

36. (Original) The computer system of claim 24, wherein:

the intermediate data processing of the reducing further comprises processing data that is not intermediate data.

37. (Original) The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

38. (Original) The computer system of claim 36, wherein:

the computer system includes a plurality of reducers; and

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the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

39. (Previously presented) The computer system of claim 24, wherein the computer system is further configured to reduce by relating the data among the plurality of data groups.

40-46. (CANCELLED)

47. (CURRENTLY AMENDED) A map-reduce method of processing data from a plurality of groups having different schema over a computer system, the method comprising:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set, wherein the first schema differs from the second schema, wherein the first and second schema have a key in common; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema,

wherein the mapping and reducing operations are performed by a distributed system.

48. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

49. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by a plurality of reducers, the method further comprises:

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partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

50. (Previously presented) The map-reduce method of claim 49, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

51. (Previously presented) The map-reduce method of claim 49, wherein at least some of the reducers include a sort, group-by-key and combine task, the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

52. (Previously presented) The map-reduce method of claim 51, wherein the reducing includes processing the metadata.

53. (Previously presented) The map-reduce method of claim 52, wherein iterating includes providing the associated metadata to the processing of the reducing step.

54. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system configured for:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping

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the second data set to a second intermediate data set, wherein the first schema differs from the second schema; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema, wherein the first and second schema have a key in common.

55. (Previously presented) The computer system of claim 54, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

56. (Previously presented) The computer system of claim 54, wherein the reducing is accomplished by a plurality of reducers, the computer system further configured for:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

57. (Previously presented) The computer system of claim 56, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

58. (Previously presented) The computer system of claim 56, wherein at least some of the reducers include a sort, group-by-key and combine task, the computer system further configured for:

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

59. (Previously presented) The computer system of claim 58, wherein the reducing includes processing the metadata.

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60. (Previously presented) The computer system of claim 59, wherein iterating includes providing the associated metadata to the processing of the reducing step.

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REMARKS

Claims 1, 24, 47, and 54 have been amended. No new matter is introduced by the amendments of these claims. Claims 1-16, 24-39 and 47-60 remain pending.

The amendments are presented herein so as to expedite prosecution, and the original or any other claim scope is not conceded. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution.

Claims 1-16 and 47-53 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. The Examiner states that claims 1 and 47 (method claims) are seemingly not tied to a machine. Claims 1 and 47 have been amended to tie the method steps to a distributed system. Since claims 1-16 and 47-53 are now tied to a distributed system, it is respectfully submitted that claims 1-16 and 47-53 meet the requirements of 35 U.S.C. §101.

The Examiner rejected claim 1-16 and 24-39 and 47-60 under 35 U.S.C. §103(a) as being unpatentable over Datar et al. (U.S. Publication No. 2007/0038659) in view of Borroughs (US Patent No. 6,341,289). The Examiner's rejections are respectfully traversed as follows.

Claim 1 is directed towards a "method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups." Claim 1 recites "for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group" and that "the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group." Claim 1 further recites that "the different schema have a key in common" and "reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group." Claim 24 is directed towards an apparatus for performing similar operations.

Claim 47 is directed towards a "map-reduce method of processing data from a plurality of groups having different schema over a computer system." Claim 47 also recites "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set" and "for a second data set having a plurality of second key-value pairs, wherein such

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second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set, wherein the first schema differs from the second schema." Claim 47 also recites that "the first and second schema have a key in common" and "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema." Claim 54 is directed towards an apparatus for performing similar operations.

Embodiments of the present invention allow map processing to be carried out independently on two or more related, but different, datasets (e.g., related by each being characterized by a schema with a key in common). The intermediate results of the map processing (key/value pairs) for a particular key are then processed together in a single reduce function. One example of joining two different schema tables is illustrated in Fig. 3:

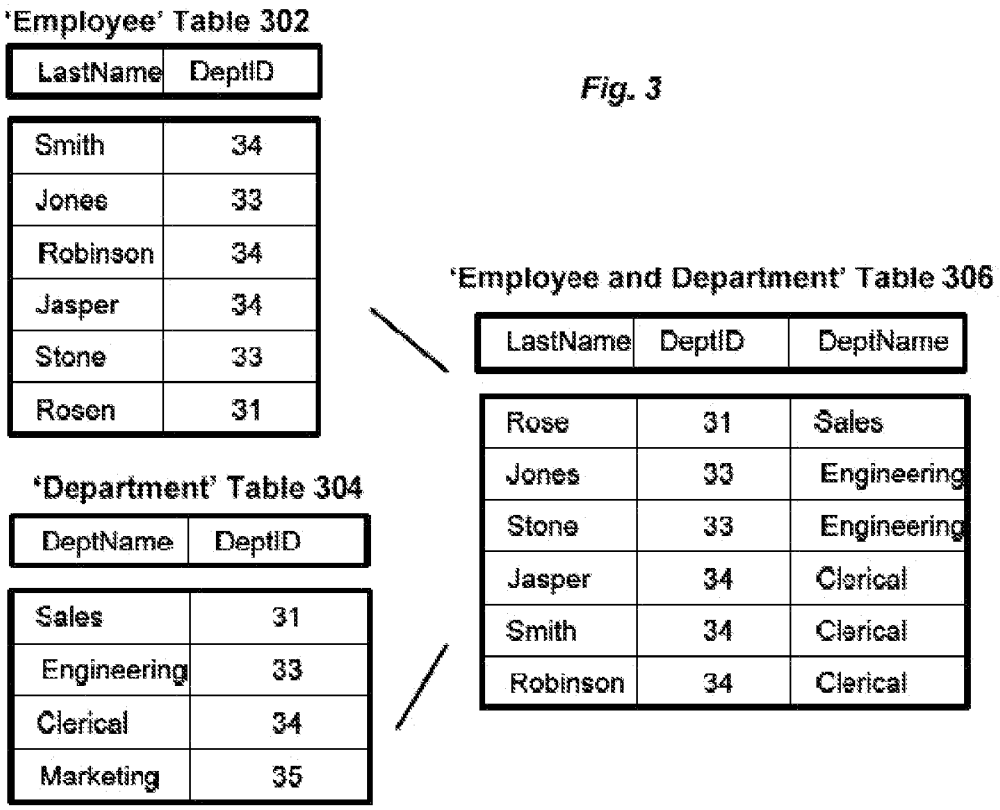


Fig. 3

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In this example, the resulting "Employee and Department" Table 306 is obtained by joining two different tables (304 and 302). In one embodiment, the following map and reduce operations are applied to these two different tables, as illustrated in Fig. 4 (abstraction of process) and 5 (applied to tables of Fig. 3):

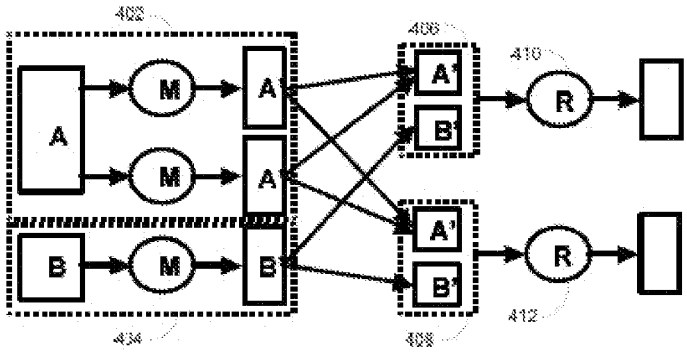


Fig. 4

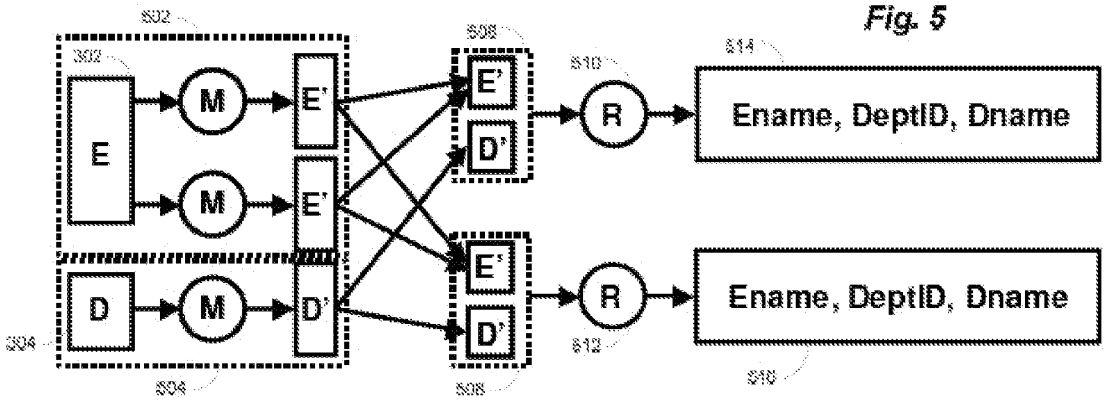


Fig. 5

In this example, two different tables, E and D, are mapped to different sets of intermediate data E' and D'. The reduce tasks 410 and 412 can then access partitioned intermediate data for both groups 302 and 304 through one iterator per group, and the reduce tasks 410 and 412 can be programmed by users to use the iterators however desired.

The Examiner admits that the primary reference Datar does not teach "wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group." The secondary reference

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Burroughs is cited as teaching this feature. Although the Examiner appears to map this claimed feature to the relational database (RDBS) and object oriented application (OO) of Fig. 1, it is respectfully submitted that Burroughs only teaches processing of data that has the same schema. See Col. 5, Lines 37-50, emphasis added: "when comparing the characteristics of two supposed framework mechanisms, the reader should take care to ensure that the comparison is indeed '*apples to apples*.'" Accordingly, Burroughs fails to disclose mapping data groups with different schema, in the manner claimed. Additionally, Burroughs fails to disclose that the different schema have a key in common.

In light of the forgoing, it is submitted that claims 1, 24, 47, and 54 are patentable over the cited art. The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-16, 25-39, and 48-60 each depend directly or indirectly from independent claims 1, 24, 47, or 54 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 24, 47, or 54. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. If the Examiner believes that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number listed at the bottom of this page.

Applicants hereby petition for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this amendment is to be charged to Deposit Account No. 504480 (Order No. YAH1P034).

Respectfully submitted,
Weaver Austin Villeneuve & Sampson LLP

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Electronic Patent Application Fee Transmittal	
Application Number:	11539090
Filing Date:	05-Oct-2006
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Filer:	Mary Ramos Olynick/Valerie Padgett
Attorney Docket Number:	YAH1P034/Y01708US01
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

Electronic Acknowledgement Receipt	
EFS ID:	8856540
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick/Valerie Padgett
Filer Authorized By:	Mary Ramos Olynick
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	17-NOV-2010
Filing Date:	05-OCT-2006
Time Stamp:	17:58:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$810
RAM confirmation Number	4610
Deposit Account	504480
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	YAH1P034_RCE.pdf	768851 513b5d6bd386b7692bc0706564bf4d2076c49e3f	no	3
Warnings:					
Information:					
2		YAH1P034_Amd_B.pdf	194297 2ddd7b357a2477f52c0bddd6aef68ac29330ed68	yes	16

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment After Final	1	1
Claims	2	12
Applicant Arguments/Remarks Made in an Amendment	13	16

Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30546 b704365c775b7445c7ab8670b381e9df94b22fa2	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	993694		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/539,090	Filing Date 10/05/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	**11/17/2010**	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 46	Minus	** 46	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***6	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/PARTHENIA MERRILL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

76239 7590 04/06/2011

Weaver Austin Villeneuve & Sampson - Yahoo!
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
PHAM, KHANH B	
ART UNIT	PAPER NUMBER
2166	

NOTIFICATION DATE	DELIVERY MODE
04/06/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@wavsip.com

American Airlines/Hilton, Ex. 1004, p.190
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Office Action Summary	Application No.	Applicant(s)	
	11/539,090	DASDAN ET AL.	
	Examiner	Art Unit	
	Khanh B. Pham	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,24-39 and 47-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,24-39 and 47-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

American Airlines/Hilton, Ex. 1004, p.191
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/17/2010 has been entered.

Claim Objections

2. Claim 3 is objected to because of the following informalities: claim 3 recites “the manner of storage” at line 2-3. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 24-39 and 54-60 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 USC 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical

compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." Both types of "descriptive material" are nonstatutory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)

Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored on a computer-readable medium, in a computer, or on an electromagnetic carrier signal, does not make it statutory. See *Diehr*, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in *Benson* were unpatentable as abstract ideas because "[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer.").

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-16, 24-39, 47-60** are rejected under 35 U.S.C. 102(e) as being anticipated by Cruanes et al. (US 2006/0117036 A1), hereinafter "Cruanes".

As per claim 1, Cruanes teaches a method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

- "for the data of each one of the data group, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group" at [0055] and Figs. 3-4;
- "wherein the data of a fist data group has a different schema than the data of a second data group" at [0005]-[0007] and Fig. 4;
- "and the data of the data of the first data group is mapped differently than the data of the second data group" at [0005], [0055];
- "wherein the different schema have a key in common" at [0005];

- "reducing the intermediate data for the data group to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group" at [0007], [0050]
- "wherein the mapping and reducing operation are performed by a distributed system" at Figs. 3-4.

As per claim 2, Cruanes teaches the method of claim 1, wherein "the at least one output data group is a plurality of output data groups" at [0055] and Fig. 4.

As per claim 3, Cruanes teaches the method of claim 1, wherein "corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group" at [0053], [0055] and Fig. 4.

As per claim 4, Cruanes teaches the method of claim 1, wherein "corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group" at [0053], [0055].

As per claim 5, Cruanes teaches the method of claim 1, wherein "processing the intermediate data for each data group in a manner that is defined to correspond to that

data group includes, for each data group, employing an iterator that corresponds to that data group" at [0055]-[0058].

As per claim 6, Cruanes teaches the method of claim 1, wherein "the intermediate data includes a plurality of grouped sets of key/value pairs; the reducing step is carried out by a plurality of reducers; the method further comprises: partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers" at [0055]-[0058] and Fig. 4.

As per claim 7, Cruanes teaches the method of claim 1, wherein "the intermediate data includes a plurality of grouped sets of key/values pairs; the reducing step is carried out by a plurality of reducers; the method further comprises "partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers" at [0045]-[0047], and [0055].

As per claim 8, Cruanes teaches the method of claim 7, wherein : in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of

the partitions. at [0045]-[0047], and [0055].

As per claim 9, Cruanes teaches the method of claim 7, wherein: " at least some of the reducers include a sort, group-by-key and combine task; the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting" at [0034]-[0038].

As per claim 10, Cruanes teaches the method of claim 9, wherein: "the reducing step includes processing the metadata" at [0034]-[0039].

As per claim 11, Cruanes teaches the method of claim 10, wherein: "processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step" at [0034]-[0039].

As per claim 12, Cruanes teaches the method of claim 5, wherein: "the intermediate data includes a plurality of grouped sets of key/value pairs; the reducing step is carried out by a plurality of reducers; for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular

data group, for that reducer" at [0055], [0059]-[0060].

As per claim 13, Cruanes teaches the method of claim 1, wherein: "the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data" at [0045]-[0047].

As per claim 14, Cruanes teaches the method of claim 13, wherein: "the reducing step is carried out by a plurality of reducers; and the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer" at [0045]-[0047].

As per claim 15, Cruanes teaches the method of claim 13, wherein: "the reducing step is carried out by a plurality of reducers; and the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer" at [0045]-[0047], [0050].

As per claim 16, Cruanes teaches the method of claim 1 wherein "the reducing step includes relating the data among the plurality of data groups" at [0050].

Claims 24-39 recite a computer system for performing similar method as in claims 1-16 and are therefore rejected by the same reasons.

As per claim 47, Cruanes teaches a map-reduce method of processing data from a plurality of groups having different schema over a computer system comprising:

- "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set" at [0005], [0055] and Fig. 4
- "for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set" at [0005], [0055] and Fig. 4;
- "wherein the first schema differs from the second schema" at [0005],
- "wherein the first and second schema have a key in common" at [0005];
- "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema" at [0050] and Figs. 3-4;
- "wherein the mapping and reducing operations are performed by a distributed system" at Figs. 3-4.

As per claim 48, Cruanes teaches the method of claim 47, wherein "the reducing is accomplished by iterating on at least one key from each of first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set" at [0006]-[0007] and [0050].

As per claim 49, Cruanes teaches the method of claim 47, wherein the reducing is accomplished by a plurality of reducers (See Figs. 3-4) , the method further comprises

"partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and providing the partitioned intermediate data set of each partition to a separate one of the reducers" at [0055], [0060].

As per claim 50, Cruanes teaches the map-reduce method of claim 49, wherein "all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers" at [0055].

As per claim 51, Cruanes teaches the map-reduce method of claim 49, wherein "at least some of the reducers include a sort, group-by-key and combine task, the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting" at [0034]-[0038].

As per claim 52, Cruanes teaches the map-reduce method of claim 51, wherein "the reducing includes processing the metadata" at [0034]-[0038].

As per claim 53, Cruanes teaches the map-reduce method of claim 52, wherein "iterating includes providing the associated metadata to the processing of the reducing step" at [0034]-[0038].

Claims 54-60 recite a computer system for performing similar method as in claims 47-53 and are therefore rejected by the same reasons.

Response to Arguments

6. Applicant's arguments with respect to claims 1-16, 24-39, 47-60 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Examiner's Note: Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the Claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

The prior art made of record, listed on form PTO-892, and not relied upon, if any, is considered pertinent to applicant's disclosure.

If a reference indicated as being mailed on PTO-FORM 892 has not been enclosed in this action, please contact Lisa Craney whose telephone number is **(571) 272-3574** for faster service.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Pham whose telephone number is (571) 272-4116. The examiner can normally be reached on Monday through Friday 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Khanh B. Pham/
Primary Examiner
Art Unit 2166

March 29, 2011

Notice of References Cited	Application/Control No. 11/539,090	Applicant(s)/Patent Under Reexamination DASDAN ET AL.	
	Examiner Khanh B. Pham	Art Unit 2166	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2006/0117036	06-2006	Cruanes et al.	707/100
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

American Airlines/Hilton, Ex. 1004, p.204
American Airlines/Hilton v. R2 Solutions
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	**Art Unit**
	Khanh B. Pham	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	✓						
	16	✓	✓	✓						
	17	✓	-	-						
	18	✓	-	-						
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	27	✓	✓	✓						
	28	✓	✓	✓						
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	33	✓	✓	✓						
	34	✓	✓	✓						
	35	✓	✓	✓						
	36	✓	✓	✓						

American Airlines/Hilton, Ex. 1004, p.205
American Airlines/Hilton v. R2 Solutions
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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	Examiner	**Art Unit**
	Khanh B. Pham	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011						
	37	✓	✓	✓						
	38	✓	✓	✓						
	39	✓	✓	✓						
	40	✓	-	-						
	41	✓	-	-						
	42	✓	-	-						
	43	✓	-	-						
	44	✓	-	-						
	45	✓	-	-						
	46	✓	-	-						
	47		✓	✓						
	48		✓	✓						
	49		✓	✓						
	50		✓	✓						
	51		✓	✓						
	52		✓	✓						
	53		✓	✓						
	54		✓	✓						
	55		✓	✓						
	56		✓	✓						
	57		✓	✓						
	58		✓	✓						
	59		✓	✓						
	60		✓	✓						

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	AMARE TABOR	2434

SEARCHED			
Class	Subclass	Date	Examiner
707	1-3	11/30/2009	YM

SEARCH NOTES		
Search Notes	Date	Examiner
Search conducted in East.	11/30/2009	YM
Class/sub-class {707} and KEYWORD search is updated	08/11/2010	aft
Consulted Hosain Alan (2166, SPE) and Khan Pham (PE, 2166]	08/11/2010	aft
Update All	3/29/11	KP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Khanh B. Pham
Filed: October 5, 2006	Group: 2166
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on July 6, 2011.

Signed: /Mary R. Olynick/
Typed: Mary R. Olynick

AMENDMENT C

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Office Action dated 6 April 2011, a response to which is due on 6 July 2011.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 13 of this paper.

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CURRENTLY AMENDED) A method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so as to result in different key-value pairs for the corresponding different intermediate data, wherein the different schema and corresponding different intermediate data have a key in common; and

reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, so as to result in a merging of the corresponding different intermediate data based on the key in common,

wherein the mapping and reducing operations are performed by a distributed system.

2. (Original) The method of claim 1, wherein:

the at least one output data group is a plurality of output data groups.

3. (CURRENTLY AMENDED) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with a ~~the~~ manner of storage is identifiable to the data group.

4. (Original) The method of claim 1, wherein:

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corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group.

5. (Original) The method of claim 1, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group.

6. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

7. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

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8. (Original) The method of claim 7, wherein:

in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions.

9. (Original) The method of claim 7, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

10. (Original) The method of claim 9, wherein:

the reducing step includes processing the metadata.

11. (Original) The method of claim 10, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step.

12. (Previously presented) The method of claim 5, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

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13. (Original) The method of claim 1, wherein:

the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data.

14. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

15. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

16. (Previously presented) The method of claim 1 wherein the reducing step includes relating the data among the plurality of data groups.

17-23. (CANCELLED)

24. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system comprises at least one processor and memory that are operable to perform the following operations ~~configured for~~:

for the data of each one of the data groups, map the data of that data group to corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first

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data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so as to result in different key-value pairs for the corresponding different intermediate data, wherein the different schema and corresponding different intermediate data have a key in common; and

reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group so as to result in a merging of the corresponding different intermediate data based on the key in common.

25. (Original) The computer system of claim 24, wherein:

the at least one output data group is a plurality of output data groups.

26. (Original) The computer system of claim 24, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

27. (Original) The computer system of claim 26, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group.

28. (CURRENTLY AMENDED) The computer system of claim 24, wherein:

~~the computer system~~ the at least one processor and memory being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, ~~the computer system~~ the at least one processor and memory being configured to employ an iterator that corresponds to that data group.

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29. (CURRENTLY AMENDED) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

~~the computer system~~ the at least one processor and memory are further operable ~~includes a plurality of reducers configured~~ to reduce the intermediate data via a plurality of reducers; and

~~the computer system~~ the at least one processor and memory are ~~is~~ further operable ~~configured~~ to:

partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

30. (CURRENTLY AMENDED) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

~~the computer system~~ the at least one processor and memory are further operable ~~includes a plurality of reducers configured~~ to reduce the intermediate data via a plurality of reducers; and

~~the computer system~~ the at least one processor and memory are ~~is~~ further operable ~~configured~~ to:

partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

31. (CURRENTLY AMENDED) The computer system of claim 30, wherein:

~~the computer system~~ the at least one processor and memory are further operable ~~is configured~~ to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions.

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32. (CURRENTLY AMENDED) The computer system of claim 30, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

~~the computer system~~ the at least one processor and memory are ~~is~~ further operable ~~configured~~ to

generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

33. (Original) The computer system of claim 32, wherein:

the reducing includes processing the metadata.

34. (CURRENTLY AMENDED) The computer system of claim 33, wherein:

~~the computer system~~ the at least one processor and memory being further operable ~~configured~~ to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, ~~the computer system~~ the at least one processor and memory being further operable ~~configured~~ to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing.

35. (CURRENTLY AMENDED) The computer system of claim 28, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

~~the computer system~~ the at least one processor and memory are further operable ~~includes a plurality of reducers configured~~ to reduce the intermediate data via a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

36. (Original) The computer system of claim 24, wherein:

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the intermediate data processing of the reducing further comprises processing data that is not intermediate data.

37. (CURRENTLY AMENDED) The computer system of claim 36, wherein:

~~the computer system~~ the at least one processor and memory are further operable ~~includes a plurality of reducers configured~~ to reduce the intermediate data via a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

38. (CURRENTLY AMENDED) The computer system of claim 36, wherein:

~~the computer system~~ the at least one processor and memory are further operable ~~includes a plurality of reducers configured~~ to reduce the intermediate data via a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

39. (CURRENTLY AMENDED) The computer system of claim 24, wherein ~~the computer system~~ the at least one processor and memory are ~~is~~ further operable ~~configured~~ to reduce by relating the data among the plurality of data groups.

40-46. (CANCELLED)

47. (CURRENTLY AMENDED) A map-reduce method of processing data from a plurality of groups having different schema over a computer system, the method comprising:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set having a first set of resulting key-value pairs;

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for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs, wherein the first schema differs from the second schema, wherein the first and second schema and the first and second set of resulting key-value pairs have a key in common; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema,

wherein the mapping and reducing operations are performed by a distributed system.

48. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

49. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by a plurality of reducers, the method further comprises:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

50. (Previously presented) The map-reduce method of claim 49, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

51. (Previously presented) The map-reduce method of claim 49, wherein at least some of the reducers include a sort, group-by-key and combine task, the method further comprises

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generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

52. (Previously presented) The map-reduce method of claim 51, wherein the reducing includes processing the metadata.

53. (Previously presented) The map-reduce method of claim 52, wherein iterating includes providing the associated metadata to the processing of the reducing step.

54. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system comprises at least one processor and memory that are operable to perform the following operations ~~configured for~~:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set having a first set of resulting key-value pairs;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs, wherein the first schema differs from the second schema; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema,

wherein the first and second schema and the first and second set of resulting key-value pairs have a key in common.

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55. (Previously presented) The computer system of claim 54, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

56. (CURRENTLY AMENDED) The computer system of claim 54, wherein the reducing is accomplished by a plurality of reducers, the ~~computer system further configured~~ the at least one processor and memory further operable ~~configured~~ for:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

57. (Previously presented) The computer system of claim 56, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

58. (CURRENTLY AMENDED) The computer system of claim 56, wherein at least some of the reducers include a sort, group-by-key and combine task, the ~~computer system further configured~~ the at least one processor and memory are further operable for:

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

59. (Previously presented) The computer system of claim 58, wherein the reducing includes processing the metadata.

60. (Previously presented) The computer system of claim 59, wherein iterating includes providing the associated metadata to the processing of the reducing step.

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REMARKS

Claims 1, 24, 28-32, 34, 35, 37-39, 47, 54, 56, and 58 have been amended. No new matter is introduced by the amendments of these claims. Claims 1-16, 24-39 and 47-60 remain pending.

The amendments are presented herein so as to expedite prosecution, and the original or any other claim scope is not conceded. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution.

Claim 3 is objected to for an informality, which is herein corrected.

Claims 24-39 and 54-60 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. The Examiner states that these claims are "clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter." It is respectfully submitted that these claims are directed towards an apparatus in the form of a computer system that is configured to perform method steps and an apparatus falls under statutory subject matter. However, the claims have been amended to clarify that the computer system comprises at least one processor and memory that are operable to perform such steps. It is respectfully submitted that claims 24-39 and 54-60 meet the requirements of 35 U.S.C. §101.

The Examiner rejected claim 1-16 and 24-39 and 47-60 under 35 U.S.C. §102(e) as being anticipated by Cruanes et al. (U.S. Publication No. 2006/0117036 A1). The Examiner's rejections are respectfully traversed as follows.

Claim 1 is directed towards a "method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups." Claim 1 recites "for the data of each one of the data groups, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group" and that "the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so as to result in different key-value pairs for the corresponding different intermediate data." Claim 1 further recites that "the different schema and corresponding different intermediate data have a key in common" and "reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group so as to result in a

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merging of the corresponding different intermediate data based on the key in common." Claim 24 is directed towards an apparatus for performing similar operations.

Claim 47 is directed towards a "map-reduce method of processing data from a plurality of groups having different schema over a computer system." Claim 47 also recites "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set having a first set of resulting key-value pairs" and "for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs,, wherein the first schema differs from the second schema." Claim 47 also recites that "the first and second schema and the first and second set of resulting key-value pairs have a key in common" and "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema." Claim 54 is directed towards an apparatus for performing similar operations.

Embodiments of the present invention allow map and reduce processing to be carried out independently on two or more related, but different, datasets (e.g., related by each being characterized by a schema with a key in common). One example of a distributed map-and-reduce processing for different schema groups is illustrated below in Fig. 5:

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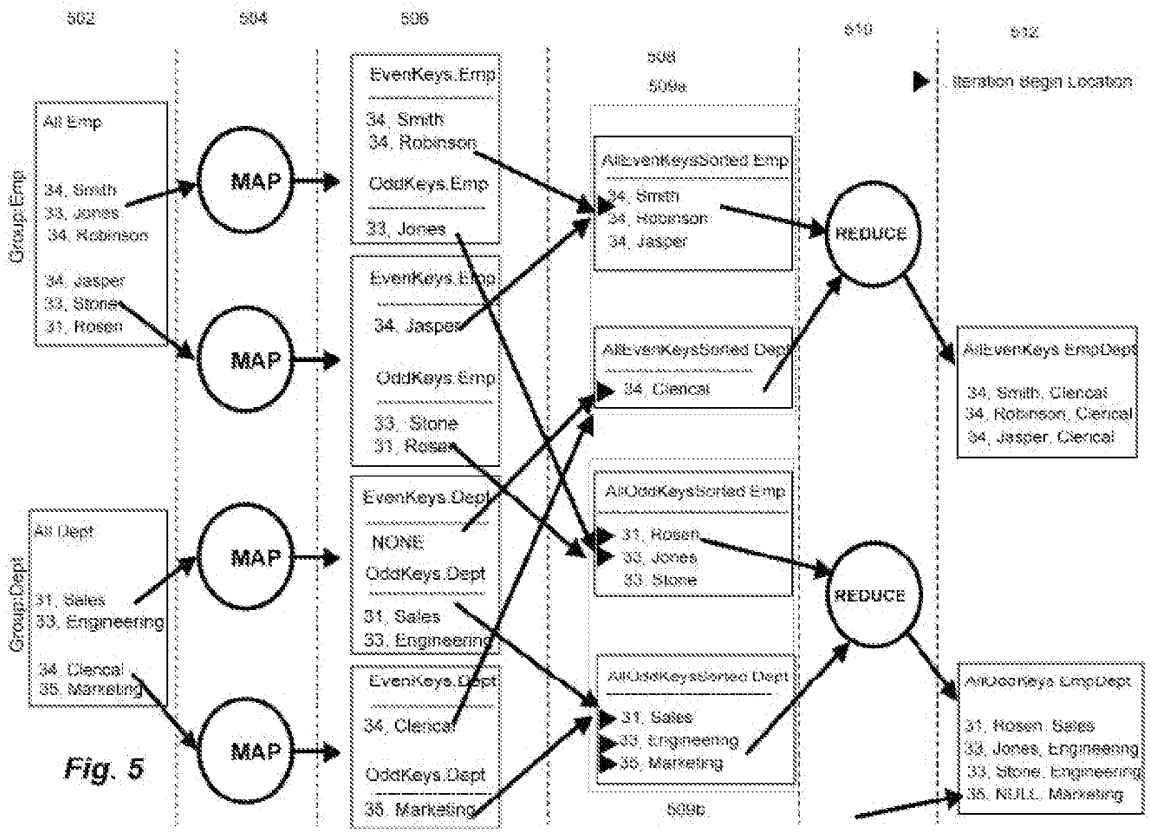


Fig. 5

As shown, a first group "Emp" is mapped (504) into "department identifier" and "employee" key-value pairs (506), while a second group "Dept" is mapped (504) into "department identifier" and "department name" key-value pairs (506). The intermediate data (506) having different key-value pairs also have a key in common, and such intermediate data (506) is then reduced or merged by one or more reduce functions (510).

The cited reference Cruanes appears to be directed towards techniques for combining information from two sources. See Abstract and Fig. 4. The cited portions appear to accomplish this combining of information by utilization of bitmap filtering using a build phase and a probe phase. See Paragraphs [0055]-[0057]. Specifically, a first table of information (dept) is partitioned, and each partition is sent to node 1 or node 2, which perform the build phase to indicate hash buckets. See Paragraph [0056]. A probe phase then operates to scan rows of partitions from a different table (emp) via the same nodes 1 and 2 using bitmap filtering and hash joining. See Paragraph [0057]. Cruanes describes bitmap filtering as using a bitmap filter to indicate whether

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buckets in the hash table have any entries for a hash join operation. See Paragraphs [0006]-[0010]. However, Cruanes fails to disclose mapping data groups with different schema so as to result in different key-value pairs of different intermediate data, in the manner claimed. Additionally, Cruanes fails to disclose that the different schema and different intermediate data have a key in common, in the manner claimed.

In light of the forgoing, it is submitted that claims 1, 24, 47, and 54 are patentable over the cited art. The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-16, 25-39, and 48-60 each depend directly or indirectly from independent claims 1, 24, 47, or 54 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 24, 47, or 54. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. If the Examiner believes that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number listed at the bottom of this page.

Applicants hereby petition for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this amendment is to be charged to Deposit Account No. 504480 (Order No. YAH1P034).

Respectfully submitted,
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Electronic Acknowledgement Receipt

EFS ID:	10465605
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick
Filer Authorized By:	
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	06-JUL-2011
Filing Date:	05-OCT-2006
Time Stamp:	21:36:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		YAH1P034_Amd_C.pdf	190171 cfa79f59e47f96d10e46a9c920ec4baf1afbd8f9	yes	16

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	12
	Applicant Arguments/Remarks Made in an Amendment	13	16
Warnings:			
Information:			
	Total Files Size (in bytes):	190171	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/539,090	10/05/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 07/06/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 46	Minus	** 46	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 4	Minus	***6	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/GLORIA ANTHONY/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

76239 7590 08/09/2011

Weaver Austin Villeneuve & Sampson - Yahoo!
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
PHAM, KHANH B	
ART UNIT	PAPER NUMBER
2166	

NOTIFICATION DATE	DELIVERY MODE
08/09/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@wavsip.com

American Airlines/Hilton, Ex. 1004, p.227
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Office Action Summary	Application No.	Applicant(s)	
	11/539,090	DASDAN ET AL.	
	Examiner	Art Unit	
	KHANH PHAM	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16,24-39 and 47-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16,24-39 and 47-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

American Airlines/Hilton, Ex. 1004, p.228
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-16, 24-39, 47-60** are rejected under 35 U.S.C. 102(e) as being anticipated by Cruanes et al. (US 2006/0117036 A1), hereinafter "Cruanes".

As per claim 1, Cruanes teaches a method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

- "for the data of each one of the data group, mapping the data of that data group to corresponding intermediate data for that data group and identifiable to that data group" at [0055] and Figs. 3-4;
- "wherein the data of a fist data group has a different schema than the data of a second data group" at [0005]-[0007] and Fig. 4;
- "and the data of the data of the first data group is mapped differently than the data of the second data group so as to result in different key-value pairs for the corresponding intermediate data" at [0005], [0055];

- "wherein the different schema and corresponding different intermediate data have a key in common" at [0005] - [0007];
- "reducing the intermediate data for the data group to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group so as to result in a merging of the corresponding different intermediate data based on the key in common" at [0007], [0050]
- "wherein the mapping and reducing operation are performed by a distributed system" at Figs. 3-4.

As per claim 2, Cruanes teaches the method of claim 1, wherein "the at least one output data group is a plurality of output data groups" at [0055] and Fig. 4.

As per claim 3, Cruanes teaches the method of claim 1, wherein "corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group" at [0053], [0055] and Fig. 4.

As per claim 4, Cruanes teaches the method of claim 1, wherein "corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group" at [0053], [0055].

As per claim 5, Cruanes teaches the method of claim 1, wherein “processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group” at [0055]-[0058].

As per claim 6, Cruanes teaches the method of claim 1, wherein “the intermediate data includes a plurality of grouped sets of key/value pairs; the reducing step is carried out by a plurality of reducers; the method further comprises: partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers” at [0055]-[0058] and Fig. 4.

As per claim 7, Cruanes teaches the method of claim 1, wherein "the intermediate data includes a plurality of grouped sets of key/values pairs; the reducing step is carried out by a plurality of reducers; the method further comprises "partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and providing the intermediate data of each partition to a separate one of the reducers" at [0045]-[0047], and [0055].

As per claim 8, Cruanes teaches the method of claim 7, wherein : in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions. at [0045]-[0047], and [0055].

As per claim 9, Cruanes teaches the method of claim 7, wherein: " at least some of the reducers include a sort, group-by-key and combine task; the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting" at [0034]-[0038].

As per claim 10, Cruanes teaches the method of claim 9, wherein: "the reducing step includes processing the metadata" at [0034]-[0039].

As per claim 11, Cruanes teaches the method of claim 10, wherein: "processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step" at [0034]-[0039].

As per claim 12, Cruanes teaches the method of claim 5, wherein: "the intermediate data includes a plurality of grouped sets of key/value pairs; the reducing step is carried out by a plurality of reducers; for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a

different key of a different schema than the iterator corresponding to another particular data group, for that reducer" at [0055], [0059]-[0060].

As per claim 13, Cruanes teaches the method of claim 1, wherein: "the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data" at [0045]-[0047].

As per claim 14, Cruanes teaches the method of claim 13, wherein: "the reducing step is carried out by a plurality of reducers; and the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer" at [0045]-[0047].

As per claim 15, Cruanes teaches the method of claim 13, wherein: "the reducing step is carried out by a plurality of reducers; and the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer" at [0045]-[0047], [0050].

As per claim 16, Cruanes teaches the method of claim 1 wherein "the reducing step includes relating the data among the plurality of data groups" at [0050].

Claims 24-39 recite a computer system for performing similar method as in claims 1-16 and are therefore rejected by the same reasons.

As per claim 47, Cruanes teaches a map-reduce method of processing data from a plurality of groups having different schema over a computer system comprising:

- "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, mapping the first data set to a first intermediate data set having a first set of result key-value pairs" at [0005], [0055] and Fig. 4
- "for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, mapping the second data set to a second intermediate data set having a second set of resulting key-value pairs different from the first set of resulting key-value pairs" at [0005], [0055] and Fig. 4;
- "wherein the first schema differs from the second schema" at [0005],
- "wherein the first and second schema and the first and second set of resulting key-value pairs have a key in common" at [0005];
- "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema" at [0050] and Figs. 3-4;
- "wherein the mapping and reducing operations are performed by a distributed system" at Figs. 3-4.

As per claim 48, Cruanes teaches the method of claim 47, wherein “the reducing is accomplished by iterating on at least one key from each of first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set" at [0006]-[0007] and [0050].

As per claim 49, Cruanes teaches the method of claim 47, wherein the reducing is accomplished by a plurality of reducers (See Figs. 3-4) , the method further comprises

“partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and providing the partitioned intermediate data set of each partition to a separate one of the reducers” at [0055], [0060].

As per claim 50, Cruanes teaches the map-reduce method of claim 49, wherein “all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers” at [0055].

As per claim 51, Cruanes teaches the map-reduce method of claim 49, wherein “at least some of the reducers include a sort, group-by-key and combine task, the method further comprises generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting” at [0034]-[0038].

As per claim 52, Cruanes teaches the map-reduce method of claim 51, wherein "the reducing includes processing the metadata" at [0034]-[0038].

As per claim 53, Cruanes teaches the map-reduce method of claim 52, wherein "iterating includes providing the associated metadata to the processing of the reducing step" at [0034]-[0038].

Claims 54-60 recite a computer system for performing similar method as in claims 47-53 and are therefore rejected by the same reasons.

Response to Arguments

3. Applicant's arguments filed 7/6/2011 have been fully considered but they are not persuasive. The examiner respectfully traverses Applicant's arguments.

Applicant explained the claimed invention in view of Fig. 5, which shows "a first group "Emp" is mapped (504) into "department identifier" and "employee" key value pairs (506), while a second group "Dept" is mapped into "department identifier" and "department name" key-value pairs. The intermediate data (506) having different key-value pairs also having a key in common, and such intermediate data (506) is then reduced or merged by one or more functions (510)"

On the other hand, the Cruanes teaches at [0005] a similar/identical example where an "emp" table are joined/merged with a "dept" table, wherein each row of the "emp" table has a deptID column that stores the unique identifier of the department in

which the employee works, and each row in the “dept" table includes a column that stores the deptID of the department represented by the row. Cruanes further states “In this example, deptID is what is referred to as the “join key” of the join operation”.

Applicant argued that “Cruanes fails to disclose mapping data group with different schema so as to result in different key-value pairs of different intermediate data”. On the contrary, as seen in the example above, Cruanes teaches mapping the “emp” table and “dept” table having different schemas. Cruanes also show at Fig. 4 the mapping results in multiple partitions of the data, similar to Applicant’s Fig. 5 which show the data group are partitioned into odd and even groups based on the keys.

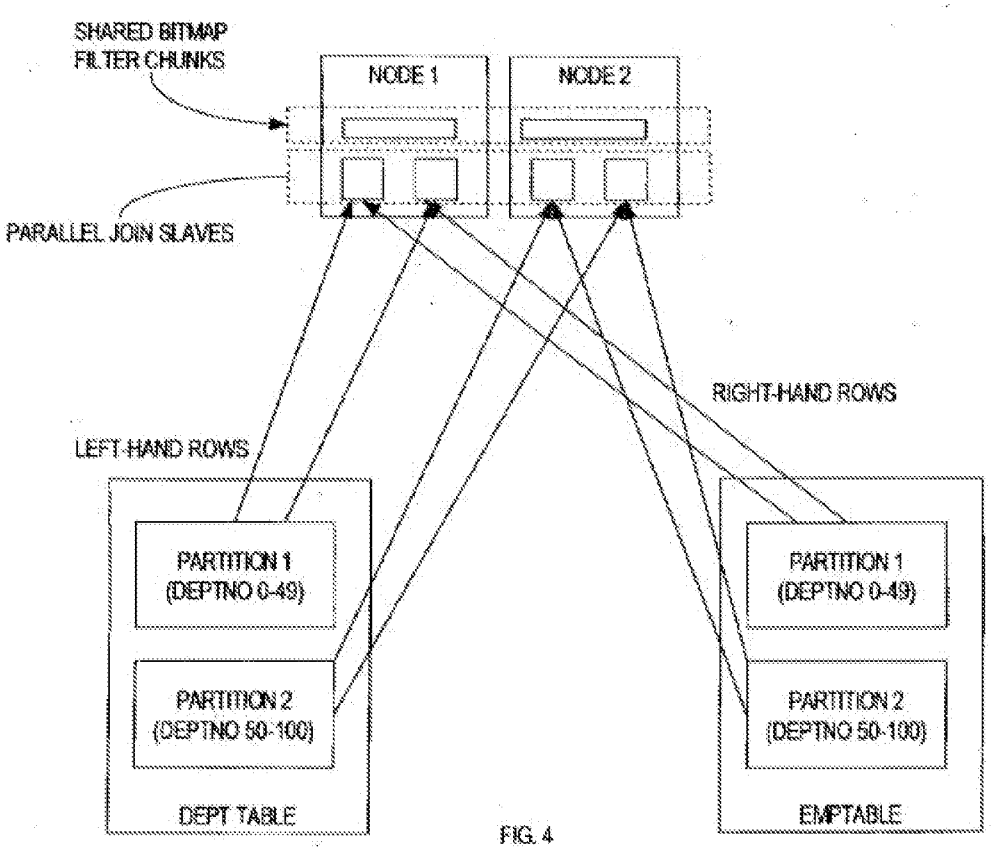


FIG. 4

Applicant further argued that Cruanes fails to disclose that the different schema and different intermediate data having a key in common. On the contrary, as discussed above, Cruanes teaches at [0005] that both "emp" table and "dept" table having a key in common (i.e. “deptID”, or "join key".)

In light of the foregoing arguments, the 35 U.S.C 102 rejection is hereby sustained.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH PHAM whose telephone number is (571)272-4116. The examiner can normally be reached on Monday through Friday 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on (571) 272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Khanh B. Pham/
Primary Examiner
Art Unit 2166

August 2, 2011

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	**Art Unit**
	Khanh B. Pham	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011	08/02/2011					
	1	✓	✓	✓	✓					
	2	✓	✓	✓	✓					
	3	✓	✓	✓	✓					
	4	✓	✓	✓	✓					
	5	✓	✓	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	✓	✓	✓	✓					
	16	✓	✓	✓	✓					
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	23	✓	-	-	-					
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	30	✓	✓	✓	✓					
	31	✓	✓	✓	✓					
	32	✓	✓	✓	✓					
	33	✓	✓	✓	✓					
	34	✓	✓	✓	✓					
	35	✓	✓	✓	✓					
	36	✓	✓	✓	✓					

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IPR2023-00689

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	**Art Unit**
	Khanh B. Pham	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011	08/02/2011					
	37	✓	✓	✓	✓					
	38	✓	✓	✓	✓					
	39	✓	✓	✓	✓					
	40	✓	-	-	-					
	41	✓	-	-	-					
	42	✓	-	-	-					
	43	✓	-	-	-					
	44	✓	-	-	-					
	45	✓	-	-	-					
	46	✓	-	-	-					
	47		✓	✓	✓					
	48		✓	✓	✓					
	49		✓	✓	✓					
	50		✓	✓	✓					
	51		✓	✓	✓					
	52		✓	✓	✓					
	53		✓	✓	✓					
	54		✓	✓	✓					
	55		✓	✓	✓					
	56		✓	✓	✓					
	57		✓	✓	✓					
	58		✓	✓	✓					
	59		✓	✓	✓					
	60		✓	✓	✓					

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IPR2023-00689

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	AMARE TABOR	2434

SEARCHED			
Class	Subclass	Date	Examiner
707	1-3	11/30/2009	YM

SEARCH NOTES		
Search Notes	Date	Examiner
Search conducted in East.	11/30/2009	YM
Class/sub-class {707} and KEYWORD search is updated	08/11/2010	aft
Consulted Hosain Alan (2166, SPE) and Khan Pham (PE, 2166]	08/11/2010	aft
Update All	3/29/11	KP
Update All	8/2/11	KP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

American Airlines/Hilton, Ex. 1004, p.242
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Khanh B. Pham
Filed: October 5, 2006	Group: 2166
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on November 9, 2011.

Signed: /Mary Terry/
Typed: Mary Terry

AMENDMENT D

Mail Stop F/O
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Final Office Action dated 9 August 2011, a response to which is due on 9 November 2011.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 14 of this paper.

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (CURRENTLY AMENDED) A method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups, the method comprising:

~~for~~ partitioning the data of each one of the data groups [[,]] into a plurality of data partitions that each have a plurality of key-value pairs and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition ~~the data of that data group~~ to form corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so that ~~as to result in different key-value pairs~~ different lists of values are output for the corresponding different intermediate data, wherein the different schema and corresponding different intermediate data have a key in common; and

reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group, so as to result in a merging of the corresponding different intermediate data based on the key in common,

wherein the mapping and reducing operations are performed by a distributed system.

2. (Original) The method of claim 1, wherein:

the at least one output data group is a plurality of output data groups.

3. (Previously Presented) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with a manner of storage is identifiable to the data group.

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4. (Original) The method of claim 1, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored in association with data that is identifiable to the data group.

5. (Original) The method of claim 1, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group.

6. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

partitioning the intermediate data into a plurality of partitions, each key/value pair of the intermediate data being provided to a separate one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

7. (Original) The method of claim 1, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the reducing step is carried out by a plurality of reducers;

the method further comprises:

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partitioning the intermediate data into a plurality of partitions, at least some of the key/value pairs of the intermediate data being provided to more than one of the partitions; and

providing the intermediate data of each partition to a separate one of the reducers.

8. (Original) The method of claim 7, wherein:

in the partitioning step, all of the key/value pairs of the intermediate data are provided to all of the partitions.

9. (Original) The method of claim 7, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

10. (Original) The method of claim 9, wherein:

the reducing step includes processing the metadata.

11. (Original) The method of claim 10, wherein:

processing the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, employing an iterator that corresponds to that data group, wherein the iterator includes providing the associated metadata to the processing of the reducing step.

12. (Previously presented) The method of claim 5, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

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the reducing step is carried out by a plurality of reducers;

for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, operates according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

13. (Original) The method of claim 1, wherein:

the intermediate data processing step of the reducing step further comprises processing data that is not intermediate data.

14. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

15. (Original) The method of claim 13, wherein:

the reducing step is carried out by a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

16. (Previously presented) The method of claim 1 wherein the reducing step includes relating the data among the plurality of data groups.

17-23. (CANCELLED)

24. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises

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a plurality of data groups, the computer system comprises at least one processor and memory that are operable to perform the following operations:

~~for~~ partitioning the data of each one of the data groups [[,]] into a plurality of data partitions that each have a plurality of key-value pairs and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition ~~the data of that data group~~ to form corresponding intermediate data for that data group and identifiable to that data group, wherein the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so that ~~as to result in different key-value pairs~~ different lists of values are output for the corresponding different intermediate data, wherein the different schema and corresponding different intermediate data have a key in common; and

reduce the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group so as to result in a merging of the corresponding different intermediate data based on the key in common.

25. (Original) The computer system of claim 24, wherein:

the at least one output data group is a plurality of output data groups.

26. (Original) The computer system of claim 24, wherein:

corresponding intermediate data for a data group being identifiable to the data group includes the corresponding intermediate data being stored such that metadata associated with the manner of storage is identifiable to the data group.

27. (Original) The computer system of claim 26, wherein:

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corresponding intermediate data for a data group being identifiable to the data group includes the computer system being configured to store the corresponding intermediate data in association with data that is identifiable to the data group.

28. (Previously Presented) The computer system of claim 24, wherein:

the at least one processor and memory being configured to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the at least one processor and memory being configured to employ an iterator that corresponds to that data group.

29. (Previously Presented) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the at least one processor and memory are further operable to reduce the intermediate data via a plurality of reducers; and

the at least one processor and memory are further operable to:

partition the intermediate data into a plurality of partitions, to provide each key/value pair of the intermediate data to a separate one of the partitions; and

provide the intermediate data of each partition to a separate one of the reducers.

30. (Previously Presented) The computer system of claim 24, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the at least one processor and memory are further operable to reduce the intermediate data via a plurality of reducers; and

the at least one processor and memory are further operable to:

partition the intermediate data into a plurality of partitions, to provide at least some of the key/value pairs of the intermediate data to more than one of the partitions; and

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provide the intermediate data of each partition to a separate one of the reducers.

31. (Previously Presented) The computer system of claim 30, wherein:

the at least one processor and memory are further operable to, in partitioning, to provide all of the key/value pairs of the intermediate data to all of the partitions.

32. (Previously Presented) The computer system of claim 30, wherein:

at least some of the reducers include a sort, group-by-key and combine task;

the at least one processor and memory are further operable to

generate and provide metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

33. (Original) The computer system of claim 32, wherein:

the reducing includes processing the metadata.

34. (Previously Presented) The computer system of claim 33, wherein:

the at least one processor and memory being further operable to process the intermediate data for each data group in a manner that is defined to correspond to that data group includes, for each data group, the at least one processor and memory being further operable to employ an iterator that corresponds to that data group, wherein the iterator is configured to provide the associated metadata to the reducing.

35. (Previously Presented) The computer system of claim 28, wherein:

the intermediate data includes a plurality of grouped sets of key/value pairs;

the at least one processor and memory are further operable to reduce the intermediate data via a plurality of reducers;

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for at least one of the reducers, the iterator corresponding to a particular data group, for that reducer, is configured to operate according to a different key of a different schema than the iterator corresponding to another particular data group, for that reducer.

36. (Original) The computer system of claim 24, wherein:

the intermediate data processing of the reducing further comprises processing data that is not intermediate data.

37. (Previously Presented) The computer system of claim 36, wherein:

the at least one processor and memory are further operable to reduce the intermediate data via a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with another reducer.

38. (Previously Presented) The computer system of claim 36, wherein:

the at least one processor and memory are further operable to reduce the intermediate data via a plurality of reducers; and

the data that is not intermediate data, for a particular reducer, includes data that is associated with that reducer.

39. (Previously Presented) The computer system of claim 24, wherein the at least one processor and memory are further operable to reduce by relating the data among the plurality of data groups.

40-46. (CANCELLED)

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47. (CURRENTLY AMENDED) A map-reduce method of processing data from a plurality of groups having different schema over a computer system, the method comprising:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition ~~the first data set~~ to form a first intermediate data set having a first set of resulting key-value pairs;

for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions ~~the second data set~~ to form a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs, wherein the first schema differs from the second schema, wherein the first and second schema and the first and second set of resulting key-value pairs have a key in common; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema,

wherein the mapping and reducing operations are performed by a distributed system.

48. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

49. (Previously presented) The map-reduce method of claim 47, wherein the reducing is accomplished by a plurality of reducers, the method further comprises:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

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providing the partitioned intermediate data set of each partition to a separate one of the reducers.

50. (Previously presented) The map-reduce method of claim 49, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

51. (Previously presented) The map-reduce method of claim 49, wherein at least some of the reducers include a sort, group-by-key and combine task, the method further comprises

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

52. (Previously presented) The map-reduce method of claim 51, wherein the reducing includes processing the metadata.

53. (Previously presented) The map-reduce method of claim 52, wherein iterating includes providing the associated metadata to the processing of the reducing step.

54. (CURRENTLY AMENDED) A computer system including a plurality of computing devices, the computer system configured to process data of a data set, wherein the data set comprises a plurality of data groups, the computer system comprises at least one processor and memory that are operable to perform the following operations:

for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition ~~the first data set~~ to form a first intermediate data set having a first set of resulting key-value pairs;

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for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions ~~the second data set~~ to form a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs, wherein the first schema differs from the second schema; and

reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema,

wherein the first and second schema and the first and second set of resulting key-value pairs have a key in common.

55. (Previously presented) The computer system of claim 54, wherein the reducing is accomplished by iterating on at least one key from each of the first and second intermediate data set so that the output data set is a merging of a portion of the first and second intermediate data set.

56. (Previously Presented) The computer system of claim 54, wherein the reducing is accomplished by a plurality of reducers, the d the at least one processor and memory further operable for:

partitioning the first or second intermediate data set into a plurality of partitions, at least some of the key-value pairs of the first or second intermediate data being provided to more than one of the partitions; and

providing the partitioned intermediate data set of each partition to a separate one of the reducers.

57. (Previously presented) The computer system of claim 56, wherein all of the key-value pairs of the first and second intermediate data set are provided to all of the reducers.

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58. (Previously Presented) The computer system of claim 56, wherein at least some of the reducers include a sort, group-by-key and combine task, the d the at least one processor and memory are further operable for:

generating and providing metadata for at least some of the mapping, partitioning, combining, grouping and sorting.

59. (Previously presented) The computer system of claim 58, wherein the reducing includes processing the metadata.

60. (Previously presented) The computer system of claim 59, wherein iterating includes providing the associated metadata to the processing of the reducing step.

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REMARKS

Claims 1, 24, 47, and 54 have been amended. No new matter is introduced by the amendments of these claims. Claims 1-16, 24-39 and 47-60 remain pending.

The amendments are presented herein so as to expedite prosecution, and the original or any other claim scope is not conceded. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution.

The Examiner rejected claim 1-16, 24-39 and 47-60 under 35 U.S.C. §102(e) as being anticipated by Cruanes et al. (U.S. Publication No. 2006/0117036 A1). The Examiner's rejections are respectfully traversed as follows.

Claim 1 is directed towards a "method of processing data of a data set over a distributed system, wherein the data set comprises a plurality of data groups." Claim 1 recites "partitioning the data of each one of the data groups into a plurality of data partitions that each have a plurality of key-value pairs and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition to form corresponding intermediate data for that data group and identifiable to that data group" and "the data of a first data group has a different schema than the data of a second data group and the data of the first data group is mapped differently than the data of the second data group so that different lists of values are output for the corresponding different intermediate data." Claim 1 further recites that "the different schema and corresponding different intermediate data have a key in common" and "reducing the intermediate data for the data groups to at least one output data group, including processing the intermediate data for each data group in a manner that is defined to correspond to that data group so as to result in a merging of the corresponding different intermediate data based on the key in common." Claim 24 is directed towards an apparatus for performing similar operations.

Claim 47 is directed towards a "map-reduce method of processing data from a plurality of groups having different schema over a computer system." Claim 47 also recites "for a first data set having a plurality of first key-value pairs, wherein such first data set belongs to a first data group and the first key-value pairs have a first schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of

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keys found in such map function's corresponding data partition to form a first intermediate data set having a first set of resulting key-value pairs" and "for a second data set having a plurality of second key-value pairs, wherein such second data set belongs to a second data group and the second key-value pairs have a second schema, partitioning the first data set into a plurality of data partitions and providing each data partition to a selected one of a plurality of mapping functions to form a second intermediate data set having a second set of resulting key-value pairs differing from the first set of resulting key-value pairs, wherein the first schema differs from the second schema." Claim 47 also recites that "the first and second schema and the first and second set of resulting key-value pairs have a key in common" and "reducing the first and the second intermediate data set together so as to form an output data set, wherein the reducing is accomplished by iterating on at least one key from the first and second intermediate data set, and the output data set has a different schema than the first and second schema." Claim 54 is directed towards an apparatus for performing similar operations.

Embodiments of the present invention allow map and reduce processing to be carried out independently on two or more related, but different, datasets (e.g., related by each being characterized by a schema with a key in common). One example of a distributed map-and-reduce processing for different schema groups is illustrated below in Fig. 5:

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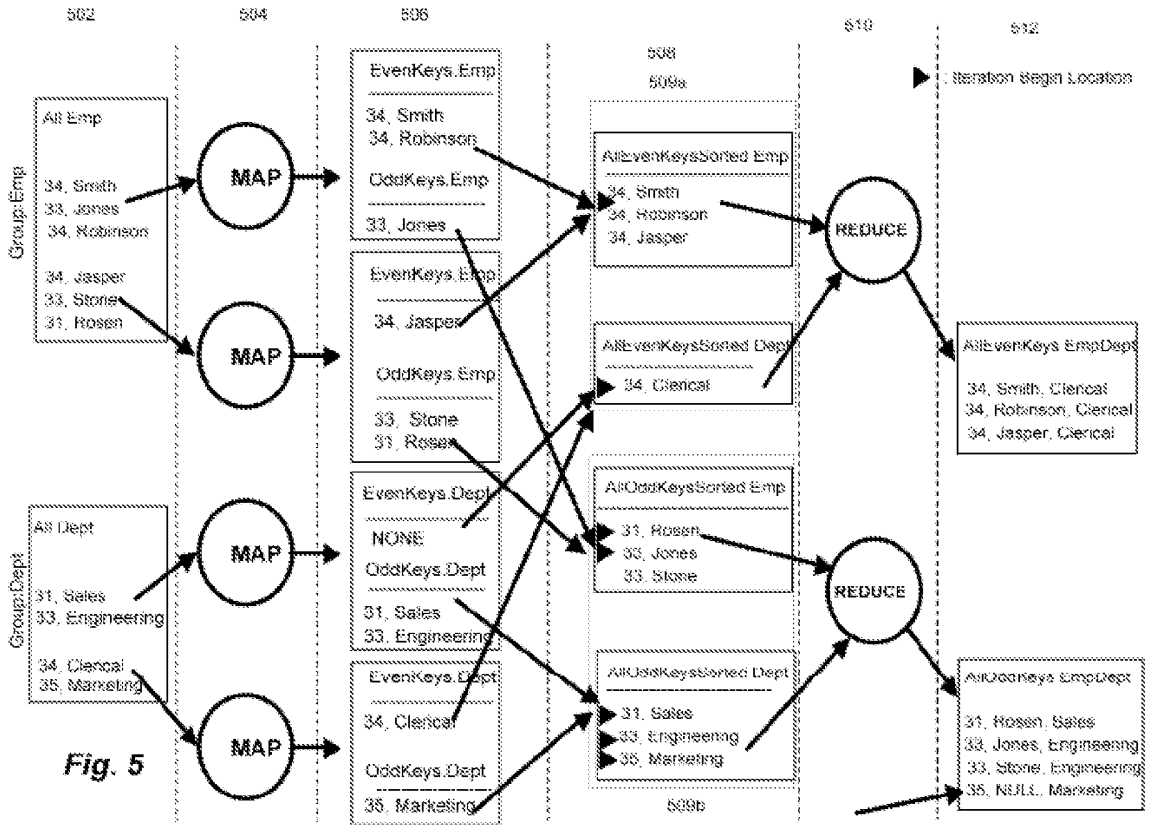


Fig. 5

As shown, a first group "Emp" is partitioned and provided to a plurality of map functions (504) that each independently output lists (506) of "employee" values for a set of "Department identifier" keys that are found in the corresponding input data partition. For example, a map function outputs a list (506) of employees "Smith" and Robinson" for Department ID key "34", as well as providing lists (506) of even and odd keys. Likewise, a second group "Dept" is partitioned and provided to map tasks (504) that each output lists (506) of "department name" for each "department identifier" key that is found in the corresponding input data partition. This intermediate data (506) for the different data groups have different lists of key-value pairs, but also have a key in common. The intermediate data (506) is then reduced or merged by one or more reduce functions (510).

Although the cited reference Cruanes appears to describe techniques for combining information from two sources, such as Employee and Department tables (See Abstract and Fig. 4), Crunes does not appear to describe techniques or apparatus for providing partitioned data from different schema data groups to different mapping tasks that independently output a plurality of

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different lists of values for each of a set of keys found in such map function's corresponding data partition to form corresponding different intermediate data for the different schema data group, in the manner claimed. Although Cruanes does describe partitioning the initial employee and department tables and sending partitions to different nodes, such nodes merely provide a joining function and do not provide a plurality of mapping functions that output lists for keys found in the data partition, in the manner claimed. Specifically, node 1 and 2 each performs a build phase to indicate hash buckets for a first table (dept). See Paragraph [0056]. A probe phase then operates to scan rows of partitions from a different table (emp) via the same nodes 1 and 2 using bitmap filtering and hash joining. See Paragraph [0057]. Cruanes describes bitmap filtering as using a bitmap filter to indicate whether buckets in the hash table have any entries for a hash join operation. See Paragraphs [0006]-[0010]. However, Cruanes fails to disclose mechanisms for "partitioning the data of each one of the data groups into a plurality of data partitions that each have a plurality of key-value pairs and providing each data partition to a selected one of a plurality of mapping functions that are each user-configurable to independently output a plurality of lists of values for each of a set of keys found in such map function's corresponding data partition to form corresponding intermediate data for that data group and identifiable to that data group" using different schemas, in the manner claimed.

In light of the forgoing, it is submitted that claims 1, 24, 47, and 54 are patentable over the cited art. The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-16, 25-39, and 48-60 each depend directly or indirectly from independent claims 1, 24, 47, or 54 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 24, 47, or 54. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. If the Examiner believes that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number listed at the bottom of this page.

Applicants hereby petition for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this amendment is to be charged to Deposit Account No. 504480 (Order No. YAH1P034).

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Respectfully submitted,
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Electronic Acknowledgement Receipt

EFS ID:	11374638
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick/Mary Terry
Filer Authorized By:	Mary Ramos Olynick
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	09-NOV-2011
Filing Date:	05-OCT-2006
Time Stamp:	19:28:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		YAH1P034_Amd_D.pdf	196563 5be242b77d0e824a348756a5d486996731 82531d	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	13
	Applicant Arguments/Remarks Made in an Amendment	14	18
Warnings:			
Information:			
	Total Files Size (in bytes):	196563	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/539,090	Filing Date 10/05/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	11/09/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 46	Minus	** 46	= 0	X $ =		OR	X $60=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***6	= 0	X $ =		OR	X $250=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/EFREM WARREN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

76239 7590 11/17/2011

Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
PHAM, KHANH B	
ART UNIT	PAPER NUMBER
2166	

NOTIFICATION DATE	DELIVERY MODE
11/17/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@wavsip.com

American Airlines/Hilton, Ex. 1004, p.264
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 11/539,090	**Applicant(s)** DASDAN ET AL.
	Examiner KHANH PHAM	**Art Unit** 2166

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 09 November 2011 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☐ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires *3* months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: *See Continuation Sheet*. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: *1-16,24-39 and 47-60*.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☐ Other: _____.

/Khanh B. Pham/
Primary Examiner
Art Unit: 2166

American Airlines/Hilton, Ex. 1004, p.265
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Continuation of 3. NOTE: New limitations added to claims 1, 24, 47, 54 require further search and/or consideration.

American Airlines/Hilton, Ex. 1004, p.266
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

DO NOT ENTER: /K.P./

11/10/2011

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Khanh B. Pham
Filed: October 5, 2006	Group: 2166
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on November 9, 2011.

Signed: /Mary Terry/
Typed: Mary Terry

AMENDMENT D

Mail Stop F/O
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Final Office Action dated 9 August 2011, a response to which is due on 9 November 2011.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 14 of this paper.

American Airlines/Hilton, Ex. 1004, p.267
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

DO NOT ENTER: /K.P./

11/10/2011

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Ali Dasdan et al.	Attorney Docket No.: YAH1P034/Y01708US01
Application No.: 11/539,090	Examiner: Khanh B. Pham
Filed: October 5, 2006	Group: 2166
Title: IMPROVED MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING	Confirmation No.: 3099

CERTIFICATE OF EFS-WEB TRANSMISSION
I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on November 9, 2011.

Signed: /Mary Terry/
Typed: Mary Terry

AMENDMENT D

Mail Stop F/O
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

It is respectfully submitted that the Examiner enters the following amendments in response to the Final Office Action dated 9 August 2011, a response to which is due on 9 November 2011.

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.
Remarks/Arguments begin on page 14 of this paper.

American Airlines/Hilton, Ex. 1004, p.268
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11/539,090	Filing Date	2006-10-05	Docket Number (if applicable)	YAH1P034/Y01708US01	Art Unit	2166
First Named Inventor	Ali Dasdan			Examiner Name	Khanh B. Pham		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other Amendment D filed on November 9, 2011

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 504480

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

American Airlines/Hilton, Ex. 1004, p.269
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Mary R. Olynick/	Date (YYYY-MM-DD)	2011-11-17
Name	Mary R. Olynick	Registration Number	42963

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

American Airlines/Hilton, Ex. 1004, p.270
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

American Airlines/Hilton, Ex. 1004, p.271
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Electronic Patent Application Fee Transmittal	
Application Number:	11539090
Filing Date:	05-Oct-2006
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Filer:	Mary Ramos Olynick/Mary Terry
Attorney Docket Number:	YAH1P034/Y01708US01
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt	
EFS ID:	11433206
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick/Mary Terry
Filer Authorized By:	Mary Ramos Olynick
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	17-NOV-2011
Filing Date:	05-OCT-2006
Time Stamp:	17:46:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$930
RAM confirmation Number	4887
Deposit Account	504480
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	YAH1P034_RCE_Trans_11-17-11.pdf	700067 e0941625445eaf5adb3ae7beb80b59ebc2eb06cc	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30461 5803a59a645dbea226c3d55766617c3e37da05f2	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	730528		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/539,090	10/05/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 11/17/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 46	Minus	** 46	= 0	X $ =		OR	X $60=	0
Independent (37 CFR 1.16(h))	* 4	Minus	***6	= 0	X $ =		OR	X $250=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DALE A. HALL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

76239 7590 04/02/2012

Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER
PHAM, KHANH B

ART UNIT	PAPER NUMBER
2166	

DATE MAILED: 04/02/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

TITLE OF INVENTION: MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

American Airlines/Hilton, Ex. 1004, p.277
American Airlines/Hilton v. R2 Solutions
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

76239 7590 04/02/2012
Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

TITLE OF INVENTION: MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHAM, KHANH B	2166	707-737000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

American Airlines/Hilton, Ex. 1004, p.278
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

76239 7590 04/02/2012

Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
PHAM, KHANH B	
ART UNIT	**PAPER NUMBER**
2166	

DATE MAILED: 04/02/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 802 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 802 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

American Airlines/Hilton, Ex. 1004, p.279
American Airlines/Hilton v. R2 Solutions
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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 11/539,090	Applicant(s) DASDAN ET AL.	
	Examiner KHANH PHAM	Art Unit 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Amendment filed 11/09/2011*.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-16,24-39 and 47-60*.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Khanh B. Pham/
Primary Examiner
Art Unit: 2166

American Airlines/Hilton, Ex. 1004, p.281
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	KHANH PHAM	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011	08/02/2011	03/21/2012				
	1	✓	✓	✓	✓	=				
	2	✓	✓	✓	✓	=				
	3	✓	✓	✓	✓	=				
	4	✓	✓	✓	✓	=				
	5	✓	✓	✓	✓	=				
	6	✓	✓	✓	✓	=				
	7	✓	✓	✓	✓	=				
	8	✓	✓	✓	✓	=				
	9	✓	✓	✓	✓	=				
	10	✓	✓	✓	✓	=				
	11	✓	✓	✓	✓	=				
	12	✓	✓	✓	✓	=				
	13	✓	✓	✓	✓	=				
	14	✓	✓	✓	✓	=				
	15	✓	✓	✓	✓	=				
	16	✓	✓	✓	✓	=				
	17	✓	-	-	-	-				
	18	✓	-	-	-	-				
	19	✓	-	-	-	-				
	20	✓	-	-	-	-				
	21	✓	-	-	-	-				
	22	✓	-	-	-	-				
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	24	✓	✓	✓	✓	=				
	25	✓	✓	✓	✓	=				
	26	✓	✓	✓	✓	=				
	27	✓	✓	✓	✓	=				
	28	✓	✓	✓	✓	=				
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	30	✓	✓	✓	✓	=				
	31	✓	✓	✓	✓	=				
	32	✓	✓	✓	✓	=				
	33	✓	✓	✓	✓	=				
	34	✓	✓	✓	✓	=				
	35	✓	✓	✓	✓	=				
	36	✓	✓	✓	✓	=				

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American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	**Art Unit**
	KHANH PHAM	2166

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/30/2009	08/11/2010	03/29/2011	08/02/2011	03/21/2012				
	37	✓	✓	✓	✓	=				
	38	✓	✓	✓	✓	=				
	39	✓	✓	✓	✓	=				
	40	✓	-	-	-	-				
	41	✓	-	-	-	-				
	42	✓	-	-	-	-				
	43	✓	-	-	-	-				
	44	✓	-	-	-	-				
	45	✓	-	-	-	-				
	46	✓	-	-	-	-				
	47		✓	✓	✓	=				
	48		✓	✓	✓	=				
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	54		✓	✓	✓	=				
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	56		✓	✓	✓	=				
	57		✓	✓	✓	=				
	58		✓	✓	✓	=				
	59		✓	✓	✓	=				
	60		✓	✓	✓	=				

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American Airlines/Hilton v. R2 Solutions
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11539090	DASDAN ET AL.
	Examiner	Art Unit
	Khanh B. Pham	2166

SEARCHED			
Class	Subclass	Date	Examiner
707	1-3	11/30/2009	YM
707	737, 968	3/21/2012	KP

SEARCH NOTES		
Search Notes	Date	Examiner
Search conducted in East.	11/30/2009	YM
Class/sub-class {707} and KEYWORD search is updated	08/11/2010	aft
Consulted Hosain Alan (2166, SPE) and Khan Pham (PE, 2166]	08/11/2010	aft
Update All	3/29/11	KP
Update All	8/2/11	KP
Update All	3/21/2012	KP
Update All	3/21/2012	KP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
707	737, 968		

American Airlines/Hilton, Ex. 1004, p.284
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	764	partition with (key with value)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/21 13:48
L2	102	1 and schema	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/21 13:50
L3	247	mapreduce	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/21 13:50
L4	44	3 AND (@rlad<="20061005" @ad<="20061005")	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2012/03/21 13:51
L5	9	4 and partition	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2012/03/21 13:55
S9	3	"20070038659"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 09:53
S10	1	"6341289".pn.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 09:54
S11	92	mapreduce	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 09:58
S12	26	S11 AND (@rlad<="20061005" @ad<="20061005")	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 10:06
S13	3	"20060101320"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 10:26
S14	1	"20050055334"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 10:27
S15	1	"20090024568"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/01/14 12:46
S16	1	"20060117036"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/02 16:04
S17	1	"7613708".pn.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/02 17:41
S18	1	"7647330".pn.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/02 17:46
S19	2	"20050055519"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/02 17:55
S20	2	"20050097260"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/02 17:55
S21	1	"20050159970"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/03 09:33
S22	774	(social adj network).ti.	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/03 09:34
S23	1	"20080134294"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/03 09:34

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S24	1	"20100017578"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/03 12:48
S25	1	"20100017578"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/03 14:33
S26	2	"20050097260"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/04 09:26
S27	2	"20050055519"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/04 10:56
S28	2	"20030172056"	US-PGPUB; USPAT; EPO; JPO; IBM_TDB	OR	ON	2011/08/04 11:58

EAST Search History (Interference)

< This search history is empty>

3/ 21/ 2012 2:00:26 PM
C:\ Users\ kpham\ Documents\ EAST\ Workspaces\ 11539090.wsp

American Airlines/Hilton, Ex. 1004, p.286
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
11539090	DASDAN ET AL.
Examiner	**Art Unit**
KHANH PHAM	2166

ORIGINAL		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
707	737	G 0 6 F 17 / 30 (2006.0)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
707	968				

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1		17	27	33	35	49								
2	2		18	28	34	36	50								
3	3		19	22	35	37	51								
4	4		20	29	36	38	52								
5	5		21	30	37	39	53								
6	6		22	31	38	40	54								
7	7		23	32	39	41	55								
8	8	17	24		40	42	56								
9	9	18	25		41	43	57								
10	10	19	26		42	44	58								
11	11	20	27		43	45	59								
12	12	21	28		44	46	60								
13	13	23	29		45										
14	14	24	30		46										
15	15	25	31	33	47										
16	16	26	32	34	48										

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 46	
/KHANH PHAM/ Primary Examiner.Art Unit 2166 (Primary Examiner)	03/21/2012 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 4

American Airlines/Hilton, Ex. 1004, p.287
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

76239 7590 04/02/2012
Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	10/05/2006	Ali Dasdan	YAH1P034/Y01708US01	3099

TITLE OF INVENTION: MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/02/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHAM, KHANH B	2166	707-737000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 WEAVER AUSTIN VILLENEUVE & SAMPSON LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: YAHOO! INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): SUNNYVALE, CALIFORNIA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☑ Issue Fee
- ☑ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 504480 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Mary R. Olynick/ Date April 16, 2012

Typed or printed name Mary R. Olynick Registration No. 42,963

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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American Airlines/Hilton, Ex. 1004, p.288
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

Electronic Patent Application Fee Transmittal

Application Number:	11539090
Filing Date:	05-Oct-2006
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Filer:	Mary Ramos Olynick/Todd Leone
Attorney Docket Number:	YAH1P034/Y01708US01

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2040**

Electronic Acknowledgement Receipt	
EFS ID:	12551989
Application Number:	11539090
International Application Number:	
Confirmation Number:	3099
Title of Invention:	MAPREDUCE FOR DISTRIBUTED DATABASE PROCESSING
First Named Inventor/Applicant Name:	Ali Dasdan
Customer Number:	76239
Filer:	Mary Ramos Olynick/Todd Leone
Filer Authorized By:	Mary Ramos Olynick
Attorney Docket Number:	YAH1P034/Y01708US01
Receipt Date:	16-APR-2012
Filing Date:	05-OCT-2006
Time Stamp:	19:29:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2040
RAM confirmation Number	6352
Deposit Account	504480
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Issue Fee Payment (PTO-85B)	YAH1P034_Issue_Fee_Transmittal_04-16-2012.pdf	251968 71e65aed15d4f2eeab08e1815412b7d29575f093	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32083 e9259fd3abe0671c186bf408c67fda2ca869e701	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	284051		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Receipt date: 10/05/2006

11539090 - GAU: 2434

PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)		
	Application Number	
	Filing Date	2006-10-05
	First Named Inventor	Dasdan et al.
	Art Unit	
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	YAH1P034/Y01708US01

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/YM/	1	7065618	B1	2006-10-06	Ghemawat et al.	

Change(s) applied to document, /SRB/ 4/17/2012

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

EFS Web 1.0.1

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/539,090	05/29/2012	8190610	YAH1P034/Y01708US01	3099

76239 7590 05/09/2012

Weaver Austin Villeneuve & Sampson - YAH1
Attn: Yahoo!
P.O. BOX 70250
OAKLAND, CA 94612-0250

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 1105 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Ali Dasdan, San Jose, CA;
Hung-Chih Yang, Sunnyvale, CA;
Ruey-Lung Hsiao, Los Angeles, CA;

American Airlines/Hilton, Ex. 1004, p.294
American Airlines/Hilton v. R2 Solutions
IPR2023-00689

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00122	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Charles Schwab Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1			
2			
3			
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5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	**Mail Stop 8** **Director of the U.S. Patent and Trademark Office** **P.O. Box 1450** **Alexandria, VA 22313-1450**	**REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK**

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00123	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Fidelity Brokerage Services LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3			
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5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

OPAP AKIMA-1 FEB 05 2021 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00091	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Walmart Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

MAR 0 5 2021
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00174	3/2/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	JPMorgan Chase & Co.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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OPAP AKIMA FEB 0 5 2021 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00092	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Target Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

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OPAP ARLINGTON FEB 05 2021 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00093	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Workday, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

PAP AKIMA-1 FEB 0 5 2021 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00090	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Deezer S.A.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Sólutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
5	9,928,279	3/27/2018	R2 Solutions LLC

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-552	6/1/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	iHeartMedia, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00093	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Workday, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
IT IS ORDERED that all claims by and between R2 Solutions and Workday are hereby DISMISSED WITH PREJUDICE.

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole	Laura Hipp	6/8/21

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-628	6/17/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Expedia Group, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00123	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Fidelity Brokerage Services LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS THEREFORE ORDERED that all claims by and between R2 Solutions and Fidelity in the above-captioned action are hereby DISMISSED WITH PREJUDICE

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole	Maria Hipon	**8/30/21**

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

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AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

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JUN 04 2021
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-552	6/1/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	iHeartMedia, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

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AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

OPAP AKIMA-1 MAR 0 8 2021 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00122	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Charles Schwab Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

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MAR 0 8 2021
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00123	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Fidelity Brokerage Services LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

OPAP
JUN 2 1 2021
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-628	6/17/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Expedia Group, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00092	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Target Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS ORDERED that all claims by and between R2 Solutions and Target in the above-captioned action are hereby DISMISSED WITH PREJUDICE.

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole		9/28/21

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-628	6/17/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Expedia Group, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
11/22/2021 - Order Dismissing Case

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	Jennifer Clark	11/22/2021

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas, Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-552	6/1/2021	Western District of Texas, Waco Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	iHeartMedia, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	7,698,329	4/13/2010	R2 Solutions LLC
2	8,190,610	5/29/2012	R2 Solutions LLC
3	8,341,157	12/25/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
10/21/2021 ORDER OF DISMISSAL (document 20)

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	L. Rivera	10/22/2021

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00940	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	FedEx Corporate Services, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
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In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00941	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	State Farm Mutual Automobile Insurance Co.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4			
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In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00944	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Agoda Company Pte. Ltd.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
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AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00942	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Booking.com B.V.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1---Upon initiation of action, mail this copy to Director Copy 3---Upon termination of action, mail this copy to Director
Copy 2---Upon filing document adding patent(s), mail this copy to Director Copy 4---Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00943	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Booking.com Transport Limited

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
5			

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

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AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00941	11/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	State Farm Mutual Automobile Insurance Co.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS ORDERED that all claims in the above-captioned action are hereby DISMISSED.

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole		12/6/21

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00091	1/29/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Walmart Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS ORDERED that all claims by and between R2 Solutions and Walmart in the above-captioned action are hereby DISMISSED WITH PREJUDICE.

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole		2/7/22

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00122	2/9/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Charles Schwab Corp.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS ORDERED that all claims by and between R2 Solutions and Charles Schwab Corp. in the above-captioned action are hereby DISMISSED WITH PREJUDICE.

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole		3/30/22

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:21-cv-00174	3/2/2021	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	JPMorgan Chase & Co.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	7,370,011	5/6/2008	R2 Solutions LLC
3			
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
ORDER OF DISMISSAL. IT IS THEREFORE ORDERED that all claims by and between R2 Solutions and JPM in the above-captioned action are hereby DISMISSED WITH PREJUDICE

CLERK	(BY) DEPUTY CLERK	DATE
David A. O'Toole	Maria Hipon	4/13/22

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Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00353	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	American Airlines, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00354	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	CVS Health Corporation; and CVS Pharmacy, Inc.,

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00356	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Hilton Worldwide Holdings Inc.; and Hilton International Holding LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00357	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Citigroup Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
5	7,370,011	5/6/2008	R2 Solutions LLC

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

OPAP LHD/SV1 MAY 0 2 2022 PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00354	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	CVS Health Corporation; and CVS Pharmacy, Inc.,

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DECISION/JUDGEMENT

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AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

OPAP UNITED STATES PATENT & TRADEMARK OFFICE MAY 02 2022

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00353	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	American Airlines, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
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DECISION/JUDGEMENT

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AO 120 (Rev. 08/10)

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Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

OPAP LHOTSKY-1
MAY 0 2 2022
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00356	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Hilton Worldwide Holdings Inc.; and Hilton International Holding LLC

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DECISION/JUDGEMENT

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OPAP LHDT SW 1
MAY 02 2022
PATENT & TRADEMARK OFFICE

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Sherman Division on the following ☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
4:22-cv-00357	4/28/2022	Eastern District of Texas, Sherman Division

PLAINTIFF	DEFENDANT
R2 Solutions LLC	Citigroup Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,190,610	5/29/2012	R2 Solutions LLC
2	8,341,157	12/25/2012	R2 Solutions LLC
3	7,698,329	4/13/2010	R2 Solutions LLC
4	8,209,317	6/26/2012	R2 Solutions LLC
5	7,370,011	5/6/2008	R2 Solutions LLC

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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DECISION/JUDGEMENT

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